IN THIS ISSUE: Christmas Plans and the Electric Washing Machine

JOURNAL OF ELECTRICITY

VOL. 43 NO. 10 SAN FRANCISCO, NOVEMBER 15, 1919 PER COPY, 25 CENTS

SIMPLEX SUNBOWL
ELECTRIC RADIATOR
Newest—Handsomest—Hottest

The Simplex Sunbowl Radiator throws more heat than any radiator yet made. In use it will increase its lead over ordinary radiators because its reflecting bowl is made of solid copper which cannot rust and will not become tarnished by the intense heat.

Radiator always turns face up if tipped over. Heating element unscrews like a lamp. Forest green finish — quick detachable guard, without welds, every wire firmly clamped in place.

Type No. 99 — Watts 600 — Standard voltages to 230.

Place your orders for the Simplex Sunbowl NOW!

Simplex Electric Heating Co.
Cambridge, Mass.

Pacific Coast Representatives:
M. SELLER & COMPANY
Distributors for Oregon and Washington
HOLBROOK, MERRILL & STETSON
Distributors for California, Arizona and Nevada

BIRNEY
TRADE MARK
SAFETY
CAR

It's a Time Saver, Alright!

One of the Birney Safety Car's most distinctive features is its ability to save valuable time for its patrons.

Its frequent service is accomplished by the operation of a greater number of cars, which is done at less total expense due to economies in power consumption and other operating and maintenance expenses. A Birney Safety Car always in sight eliminates lengthy delays on street corners.

This and its unusually quick operation—starting, running and stopping,—wins for the Birney Safety Car the hearty commendation of the public.

Railways everywhere have found that the Birney Safety Car's popularity and increased mileage obtained have more than paid for their installation. The increased revenue secured on many lines has paid for the cars within two years.

Birney Safety Cars also furnish most comfortable riding. Supporting 75 per cent. of weight of carbody and passenger load on combination coil and quarter-elliptic springs at its four corners prevents carbody oscillation. The Standard Safety Car Truck is the steadiest riding single-truck ever built.

Utmost safety is also another feature which is highly important. Safety devices automatic and simultaneous in operation protect the Birney Safety Car's quickened operation.

THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO. St. Louis, Mo.
G. C. KUHLMAN CAR CO. Cleveland, Ohio
WASON MANFG. CO. Springfield, Mass.

BRILL

JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor

VOLUME 43 | SAN FRANCISCO, NOVEMBER 15, 1919 | NUMBER 10

Contents

EDITORIALS 441

The End of the War—Everybody Works—Vast Power Development in the West—A Profitable Sharing of Interest—The Standard Form of Estimate Sheet — Additional Railway Electrification — Charitable Advertising—News for the Newspapers—The Ultimate Standard Required.

SELLING THE WASHING MACHINE 444

A practical symposium of merchandising and publicity methods used in the selling of washing machines in the Northwest.

CHRISTMAS WINDOWS 446

An attractive series of pictures showing Christmas window displays which have sold goods and promoted the electrical gift idea.

A WASHING MACHINE SERVICE STATION 448

A new departure in merchandising establishments, specializing in washing machines and cooperating with the regular contractor-dealer.

THE WASHING MACHINE CAMPAIGN AS A BUSINESS BUILDER 456

The story of a successful washing machine campaign, the methods used in conducting it, and the results it brought both in the matter of immediate business and permanent growth.

THE PUBLIC LIBRARY FOR THE BUSINESS MAN 457

An account of the work of the Seattle Public Library in meeting the business and professional needs of the community, and the publicity methods used to inform the public of the service which it is prepared to render.

THE CASE FOR ADVERTISING — by G. Douglas Mantle 460

The question of having a settled advertising policy, how to handle it, and how to measure its results.

ELECTRICALLY OPERATED WASTEWAYS OF THE TIETON CANAL — by C. F. Gleason 464

The special electrical features of the big Tieton Irrigation Project, and details of their operation.

THE NEW PHYSICS — by A. C. Crehore 466

The first of a series of articles which will contribute something new and vital to the scientific world in the interpretation of physical formulae.

Home Electricity in the West—Frontispiece 440
Do Your Christmas Shopping Early 445
A Prize Display Float 452
The Electrical Household Appliance Business — by Phil H. Gough 454
Western Ideas 454
An All-Electrical Christmas 455
San Francisco Electrical Development League — by Henry Bostwick 459
Better Lighting 462
Engineers of Yesterday — by A. L. Jordan 463
Technical Hints—by Louis Etshokin 468
Electrification of Swiss Railways — by F. Dossenbach 469
The Railway Automatic Substation 470
Sparks 471
Personals 472
Meeting Notices for Electrical Men 474
The Value of Publicity to the Electrical Industry—by H. W. Onken, Jr. 477
Happenings in the Industry 480
Latest in Everything Electrical 482
Books and Bulletins 484
The Vacuum Cleaner 483
New Electrical Developments 485

TERMS OF SUBSCRIPTION: United States, Cuba and Mexico, $2.50 per year; Dominion of Canada $3.25 per year; elsewhere $4.00 per year; Single Copies, current month 25c each.

Entered as second class matter Jan. 1, 1917, at the San Francisco Post Office

PUBLISHED SEMI-MONTHLY BY THE

TECHNICAL PUBLISHING COMPANY

ELECTRIC BUILDING, 171-173 SECOND ST., SAN FRANCISCO

Member Audit Bureau of Circulation

WILLIS M. DEMING
President & General Manager

ROBERT SIBLEY
Vice-President & Editor

ARTHUR H. HALLORAN
Secretary

Index to Advertisers—page 20 Where to Buy in the West—pages 21-26

The fact that the West claims four times the per capita consumption of electricity of the remainder of the United States is in some measure due to the more extensive use of electricity in the home. With the high labor costs and the high standard of living maintained throughout the West in urban and rural districts alike, electrical labor saving devices are becoming more and more popular. It is an astonishing fact that a larger money value of washing machines was sold to American women last year than electric irons. In this phenomenal sale, the West had its full share — and it may fairly be said that the electric washing machine is today one of the most important elements in electrical merchandising.

NOV 24 1919

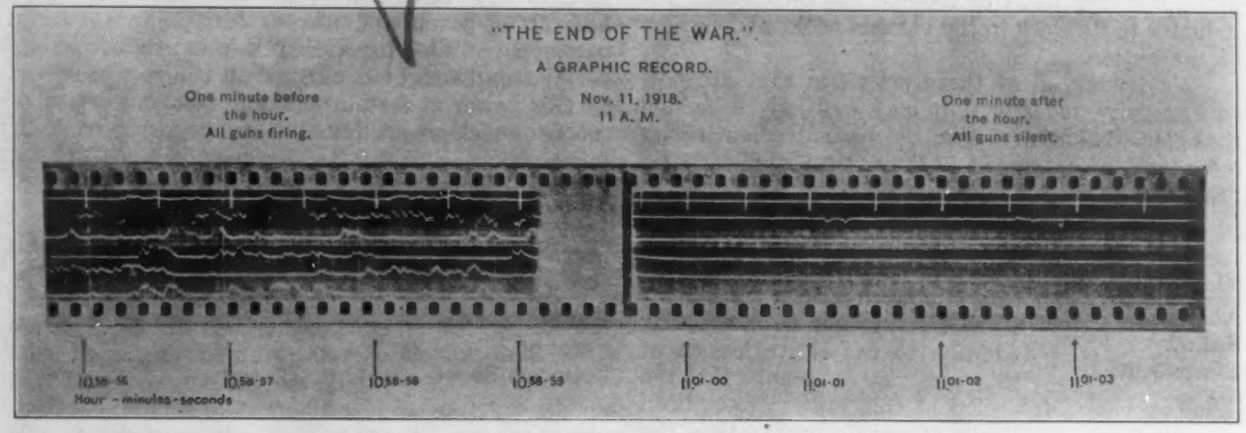
CLB450238

JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 43 SAN FRANCISCO, NOVEMBER 15, 1919 Number 10

(Copyright 1919, by Technical Publishing Company)



THE recording tape pictured above presents a remarkably graphic history of "the end of the war," one year ago—11 November, 1918. It is the tape from an American electrical listening-instrument on the battle-front, used to locate enemy batteries. It is calibrated to show fifths of a second of time. With photographic accuracy it illustrates the cessation of artillery activity on the American sector near the river Moselle, at 11 o'clock on the day of the Armistice. Truly, history has been here written electrically!

The perfection of sound-ranging devices is typical of the many services rendered by American engineering and technical enterprise toward the winning of the world conflict. These were among the scientific instruments which the Germans, with all their boasted efficiency, were never able to produce successfully for themselves. In "America's Munitions," the remarkable report of Benedict Crowell, Assistant Secretary of War, the uncanny accuracy of this sound-detecting equipment is indicated—one American instrument located 117 gun positions in a single day. The recording instruments, or microphones, were of a sort so delicate that their use had never been considered possible outside of laboratories; yet through American ingenuity they were employed with success amid the din and concussion of heavy bombardments. So accurately did their data check that enemy gun positions could be determined within 50 feet, by instruments several miles away.

As this little photographic film so eloquently testifies, the guns of conflict have been silenced—perhaps, as is our fervent hope, for all time. Yet Armistice Day, in1919, calls us to face tremendous new industrial problems which bulk as great in magnitude as those of the critical war period. Civilization still remains in the balance. It is for the splendid vision of the electrical industry to assist the inventive spirit of America to triumph, now as then. It is for the men of the West to lend their wholehearted loyalty to the cause of America, so that our nation may advance as never before. Amid the rejoicing of Armistice Day, the West is not forgetful of the paths of peace, beset with difficulties, yet leading into a future which appears radiant.

"Everybody Works"

The slogan that R. H. Ballard, vice-president of the Southern California Edison Company and president of the National Electric Light Association, passed out some months ago at the beginning of his term of office—"Everybody Works"—has indeed taken hold of the industry from one end of the nation to the other. It is interesting to note how his recent journey throughout the entire district covered by geographical sections of the National Electric Light Association, has shown activity present on all sides, and this activity will be expressed in the biggest convention electrical that has ever taken place in the nation, in the magnificent setting at Pasadena during May, 1920, when the National Electric Light Association will hold its annual convention under Mr. Ballard's administration.

Some of the vital points that Mr. Ballard is so forcibly hammering home are: The necessity for the establishment of a sound public opinion based on service to the public rendered by utility organizations, and that this sound public opinion must be brought about by the contact with the individual of the company in rendering service to the public; and the discussion and investigation of helpful and timely problems facing the industry, such as railway electrification, water power legislation, and the establishment of uniform accounting systems under commission regulation in the respective states. These subjects are indeed timely and paramount for the welfare of the industry.

Then, too, his care and foresight in bettering the internal workings of the industry are not to be overlooked. In California, electrical cooperation has become a by-word, and the nation as a whole have their eyes focused on the California Electrical Co-operative Campaign that is now under way. In his wisdom and foresight, Mr. Ballard has appointed L. H. Newbert, chairman of the Advisory Committee of the California Electrical Cooperative Campaign, to act as chairman of his Committee on Cooperation of the National Association, and it is believed that the helpful ideals that have been brought to such forceful light in California will vastly serve to establish a working basis of cooperation throughout the industry in its work in the various nooks and corners of the nation.

Reviewing all of these activities that are now so forcefully under way, it may well indeed be said that Mr. Ballard's slogan is becoming each day more and more capable of practical application—"Everybody Works."

Additional Railway Electrification

The recent extension of an additional 217 miles on the Chicago, Milwaukee and St. Paul Railway, that is now electrified from Seattle on East, makes an interesting addition to the electrification of this remarkable road. For the past two years, 440 miles of this railway have been electrified over the Rocky Mountain passes, thus the new addition makes available something over 650 miles, and by spring it is estimated that over 800 miles in all will be in operation.

Travelers continually going West and East over this railway, and engineers from all sections of the country, report on this very remarkable accomplishment and become enthused over the possibilities of railway electrification. Many engineers travel in a cab over the Rocky Mountain division in order that they may be directly in the locomotive to learn how control and delicate operation is performed. The entire subject of railway electrification is today being given most earnest consideration and more interest is being shown on the part of the public than perhaps any of the other great national problems concerned with fuel conservation, in that it is realized that the possibilities of railway electrification make available one of the real sources of conservation of natural resources that may be brought about within the next decade, in the saving of fuel oil, saving of coal, and the use of our vast water power resources.

Vast Power Development in the West

The new interconnection that is now under way at Newman, California, which will tie-in the power lines of the San Joaquin Light and Power Corporation and the Pacific Gas & Electric Company, is interesting from many viewpoints. In the first place it will make one string of power lines from Medford, Oregon, on the north, down through California into Mexico in the south, and overlapping into Arizona and Nevada. Indeed, from Medford, Oregon, down to Los Angeles and up again to Wonder, Nevada, a distance of 1400 miles and over, of transmission will thus become available.

Looked at from another viewpoint, the vastness of power companies in the West is interesting. Thus, as brought out recently by R. H. Ballard in an address at San Francisco, the two companies — the Pacific Gas & Electric Company and the Southern California Edison Company combined—serve an area that is occupied by over 240 companies in New England. Truly, then we may grasp some nature of the vastness of interconnection in power service distribution in vogue in the West.

But the real vision of possibility that comes up for consideration when contemplating such vast networks of transmission out West, as instanced in this case, is the realization of the fact that since each kilowatt of power put into service means wonderful new opportunities for agriculture and industrial development throughout all time in the region served by this power, a certain new and pleasing aspect of future development for the great section of our country bordering the Pacific Ocean is thus brought to consciousness.

The Standard Form of Estimate Sheet

While it is true that some years back, the standard form of estimate sheet was gotten out by the National Association of Contractor-Dealers, which has proved very helpful to the large contractor-dealer, it is also true that no small estimate nor standard form today exists. Would it not be an excellent plan to give considerable publicity to this fact, to bring out discussions at contractor-dealer meetings throughout the West so that a standard form may be devised for use West of the Rocky Mountains where often conditions are quite different from those prevailing in other parts of the country?

The Journal of Electricity would be most happy to receive suggestions of this nature and give publicity to this matter, so that the adoption of a standard form, best adapted to Western usage, may be early adopted.

A Profitable Sharing of Interest

Of late there has been, perhaps, a tendency among men of the industry in California to direct their utmost energies to the success of the California Electrical Cooperative Campaign, to the exclusion of other activities of well-recognized merit. Now, by its very name, this admirable campaign is **cooperative,** and its wellbeing depends largely on the existence of strong organizations representing the various branches of the electrical industry. Its leaders recognize this; they have manifested no desire to subordinate organized effort in other directions. Surely, they have not requested nor required the dropping of all else to achieve success for the movement they sponsor.

There is room in the electrical field for many good and splendid things to grow up and prosper side by side. In such a big field, who shall fear over-crowding? Time has shown the essential value to California electrical interests of such representative bodies as the Pacific Coast Section, N. E. L. A.; of the jobbers' association; of the state and local

organizations of contractors and dealers; of the Electrical Development Leagues of San Francisco and Los Angeles. Each of these requires and must have the necessary driving force of enthusiasm. Their members must not become forgetful of this insistent demand. It is a question of profitable sharing of time and energy amongst several activities which are complementary.

By all means let the California Electrical Co-operative Campaign represent symbolically the co-ordinated advance of all the different organizations which long have been recognized as indispensable to the electrical industry.

The Ultimate Standard Required

Continual discussion is rife relative to how contractor-dealer stores should be rated as to workmanship and quality of material. Be it known that there is only one standard form on these subjects, and that is on the service and installation rendered to the consumer.

Such a standard is the ultimate standard of quality, both of material and workmanship, that is desired in installation of all matters electrical, and on this basis of standardization workmanship of all degrees and characters must pass the ultimate inspection and the public itself be the final judge. Such a basis of comparison avoids the boycott in its odious sense and makes possible a competition of service that relieves itself of the sting of antagonism of personality that would otherwise exist and brings to bear the very highest efforts on the part of the contractor-dealer and others engaged in forwarding the electrical industry.

Charitable Advertising

A certain company paper circulated exclusively among employes not long ago solicited and obtained an advertisement from a manufacturer whose product could not by any possibility have been used by their employes. The advertiser could expect no return on his advertisement—and his expenditure of money would be incomprehensible were it not for the strange coincidence that he was at that time negotiating an order of large proportions from the company whose employes published the paper.

Every manufacturer, indeed every merchant, wholesale or retail, is familiar with the program whose publication is to be made possible through the advertisements of those who wish to encourage the cause which the program represents. Certain organizations have not been above publishing their proceedings at the expense of those who felt they could not afford to incur the enmity of the members of that organization—a mild form of blackmail.

All this is reprehensible in its tendency and a menace to the companies which indulge in it. An advertisement should be neither a gift to charity nor a bribe. The fact that merchants must meet this situation places an unjust burden upon the advertising appropriation. Just so much of the fund set aside for advertising purposes as is diverted to the cause of charity or is parceled out in lieu of company donations to that organization's program or this customer's house organ, just so much less are the returns than those to be expected from a given appropriation. Advertising itself is discredited and in the end no one benefited.

It is of interest therefore to note that business men are taking a stand against this imposition upon their purses. One Western chamber of commerce has adopted the slogan, "No advertisement as a contribution." It may be recognized that no legitimate advertising medium will solicit donations under the guise of advertising, and such unauthorized publications as follow this practice should have clearly pointed out to them the questionable position in which they place themselves.

News for the Newspaper

It is interesting to note that the effect of co-operative advertising has already begun to be felt in the attention given the electrical industry through the news columns of local papers. The electrical page which has come to be a feature of the Bakersfield Californian is but one instance of the closer cooperation of the electrical people with the daily press which is resulting from the wider recognition by the electrical industry of publicity as a factor in success.

It is hoped that in time this relationship with the press may be as close as that of the automobile industry. But in this connection let us profit by the mistakes of the automobile dealers as well as their signal successes. The automobile section of the paper is too often a mere enlarged advertisement written in news form, a series of "puffs" obviously composed by the men most interested. The public that has learned to distrust patent medicine advertisements written in news form, is quick to recognize that any "news" here presented is colored to suit the desires of the advertiser—and usually skips this section of the newspaper entirely.

Aside from the ethical question as to whether a frank advertisement should masquerade under another form, think of the opportunity which has been lost to the automobile industry to fill these columns with real news. An astonishingly large per cent of the public is interested in automobiles, and if they were sure they could find impartial, up-to-the-minute information, of the type presented in automobile magazines, would follow it closely. The electrical industry has the advantage of an even more interesting subject to present—and if it is to ask for the cooperation of the newspaper through its news columns, let it secure the full value of the space opened to it by selling the public the electrical idea through news matter which is interesting because it is to be trusted.

IN THE NEXT ISSUE: Electricity and the Lumber Industry

Selling the Washing Machine

(The washing machine is perhaps attracting more attention at the present time than almost any other electrical appliance, and is receiving a goodly share of prominence in all electrical advertising. Special factors applying to the sale of washing machines are interestingly brought out in the following symposium of actual methods used successfully in the Northwest.—The Editor.)

"The problem of selling washing machines is primarily a problem of getting the machines before the prospective buyers, and showing them what the machines will do." This statement by a dealer is borne out by the amount of special attention now being given both by manufacturers and dealers to the advertising and demonstrating of these appliances.

Advertising —

In a recent survey of Northwest activities along these lines it was found that most companies hand-

Without Wear, Work or Worry
The Famous
APEX
ELECTRIC
WASHING MACHINE
Handles Your Laundry
Every Week!
Your investigation and comparison of washing machines will convince you that the APEX is the PERFECT Washing Machine.
1st. The APEX is guaranteed to wash faster than others.
2d. The APEX employs the most harmless methods known.
3d. The APEX is easier to keep clean and sanitary.
Note These Features
The copper tub will never rust and will not accumulate the slimy, soapy deposit which clings to wood or galvanized metal.
There is no heavy cylinder to lift out and clean and no moving parts in the tub. The Apex is practically self-cleaning.
The APEX is All Metal. Most simple mechanism of any washer construction.
TEST THE APEX FOR ONE WEEK.
It will be a revelation to you.
The APEX costs but little—sold on easy terms.
J. C. English Co.
Upstairs at 148 Fifth st., between Morrison and Alder.
Phone Main 143.
"S & H" STAMPS GIVEN.

A sample of the advertising used by J. C. English Company of Portland, Ore., during a washing machine campaign. Large spaces were taken in the papers every day so that the subject was constantly before the public.

ling washing machines laid special stress on advertising, planning consistent campaigns over varying periods of time. The Stubbs Electric Company of Portland, Ore., for instance, put on special advertising campaigns during the spring and fall in all the city and many country papers, in which they mention the names of all their dealers. They also organize advertising campaigns for their country dealers, furnishing cuts, slides for theatres, window trims, cards and circulars. Some companies, notably the Portland Railway Light & Power Company and J. C. English Company of Portland, have experimented also with street car advertising, but have discontinued it as expensive and unsatisfactory. The latter company also furnish all their dealers in the larger cities with advertising copy, together with selling suggestions which have been tried out in advance.

The Electric Service Company of Oregon differ from most other companies in that they do no newspaper advertising, but rely entirely upon circular letters and telephone calls.

The Pacific States Electric Company of Portland also do no local advertising but direct the campaigns of their dealers in local newspapers through a special sales promotion bureau.

Demonstrations —

But though advertising develops prospects, a great deal of personal work is found necessary in connection with the sale of washing machines, one of the most productive being in the form of demonstrations. These are variously conducted, some companies preferring to demonstrate their machines in the stores, as in the case of the Pacific States Electric Company, the Electric Service Company and the J. C. English Company; others finding it advantageous to send out the machines on trial. The Stubbs Electric Company, who allow thirty days free trial, state that not one per cent of the machines so sent out ever come back to the store. The J. C. English Company maintain a model laundry in which

The Servant Problem and the Solution—
Electric Service affords the quickest and most practical solution of the servant problem.
Don't worry because you can't get a maid who will do the washing.
Don't fret because there is a scarcity of laundresses or your laundress disappoints you.
Equip Your Home With an Electric Washing Machine
With this machine you can easily do the weekly washing yourself in less than half the time required by the laundress.
An Electric Washing Machine washes with far less wear and tear on clothes than is possible by hand.
Five cents or so for Electricity usually covers the cost of our Service.
Drop in at our ELECTRIC STORE today and let us show you
Telephone Marshall 5100
Portland Ry., Light & Power Co.
Start
Finish
Electric Service
Is a Blessing on Washday
No longer is the housewife dependent on the maid, laundress or laundry. No longer need the weekly washing mean a day of unbroken drudgery, of steam tubs and boiling suds.
Electric Washing Machines
now do the hard, unpleasant work and do it more quickly and far better than the most painstaking hand method.
We sell Thor, Edor, Maytag, "1900" Cataract and Western Electric Washers—a washer for every pocketbook.
Let us show you how one quickly pays for itself.
Tel. Marshall 5100
ELECTRIC STORE
Portland Railway, Light & Power Co.

Two effective newspaper advertisements used by a power company in a washing machine campaign. The copy is carefully phrased to appeal to the housewife

clothes can be washed, dried and ironed in thirty minutes, and except on special feature days, advertised in advance, machines are not sent out on trial. Several companies follow the plan, when a sale is made, of giving the customer a thorough demonstration in the home, in order that full efficiency may be obtained with the first wash.

Prospects —

Prospects are secured in various ways, by advertising, by personal calls, by telephone, by house-to-house canvass. In the case of the Pacific States Electric Company the sales promotion bureau assists the dealers with circular letters, following them up by the use of a card index system. The Scott Elec-

tric Company of Portland emphasize the value of good location and window displays as methods of attracting customers, believing that selling from the store is more profitable than selling through solicitors. Where these elements cannot be relied upon it is well to use solicitors even though a much larger organization is required than is necessary to handle the same volume of business from the floor of the store.

Laundry Strike Settled
As Far as You Are Concerned, When You Have a
Crystal
Sent to
Don't forget that
as well as the washing. The
no wood.
free trial offer expires October 10. Place your order now.
Don't wait for the final rush and be disappointed.
STUBBS
ELECTRIC CO
SIXTH AT PINE
BOTH PHONES

First and last sections of a campaign advertisement which occupied almost half a page in a newspaper

Good salesmen are also extremely important, according to this company. "A good salesman is an asset, and a poor one is a liability." Stimulating the work of salesmen by offering prizes has been found effective in many cases.

The Portland Railway Light and Power Company arrange for two of the regular retail store clerks to follow up prospects in the forenoon of each day.

The Stubbs Electric Company have a plan by which the salesmen who close deals with the country dealers are followed up by regular "specialty men" at the company's expense.

Financing —

In the matter of financing, most of the companies handle their own paper, and in some cases their dealers' also. The Scott Electric Company discounts its paper to one or two companies who make a business of handling automobile paper, but makes a point of handling its own collections as this keeps it in closer touch with customers. The Pacific States Electric Company and the J. C. English Company use the Morris plan.

The usual period on time payments is about six months, though some companies give from ten to twelve. The Electric Service Company endeavors to get at least two payments from the customer before the end of the sixty days allowed by the jobber to the dealer; the balance is then borrowed from a local bank as a straight three months' loan at 8%.

Service —

In selling washing machines most companies make arrangements to follow up their sales with a certain amount of service in repair work. Frequently the manufacturer maintains a man who is available to attend to defective machines while dealers take care of minor troubles. The J. C. English Company employs a boy with a Ford who also makes it a business to watch for new prospects and to sell both washing machines and vacuum cleaners.

Both this company and the Electric Service Company reward in cash any customer who helps to make a sale.

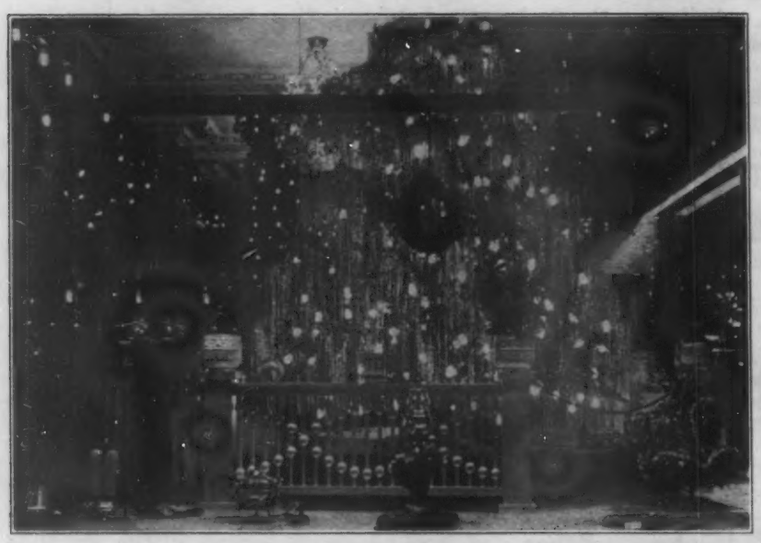
Summarizing the methods used to sell washing machines, the Scott Electric Company maintains that there is no actual "best way" of selling. What works in one district does not necessarily work in another, and it is necessary to use all the methods and to be continually adapting them to circumstances.

UTAH POWER & LIGHT CO.
A FEW CHRISTMAS GIFT SUGGESTIONS FROM OUR LARGE AND VARIED ASSORTMENT OF BEAUTIFUL, USEFUL, ELECTRICAL APPLIANCES
Dear Madam:
We know you're busy. It's in the air. There's so much to be done in every little 24 hours' round that unless you have all the modern labor savers, the atmosphere just naturally gets stirred up and shrill.
That's why we're made a big effort to hurry ahead a bit and help you plan for the busiest time of all—Christmas.
Christmas is wonderfully happy and joyous, but every minute is so crowded that sometimes—well it becomes a little "too much", doesn't it?
And so we're suggesting that you take time "firmly by the forelock" and start thinking Christmas—now.
In selecting gifts it has doubtless occured to you that your family and friends—like you—are tremendously busy. Why not give them something to lighten the load—to set them free for friendly times!
You'll find electrical appliances the most welcome of all Christmas gifts. Inexpensive to buy and economical to operate, they express your thoughtfulness by years of fine, capable service.
And there's such a wonderful range of selection! Come in and let us show you the variety of beautiful, durable, electrical helpers.
Sincerely yours,
Utah Power & Light Co.

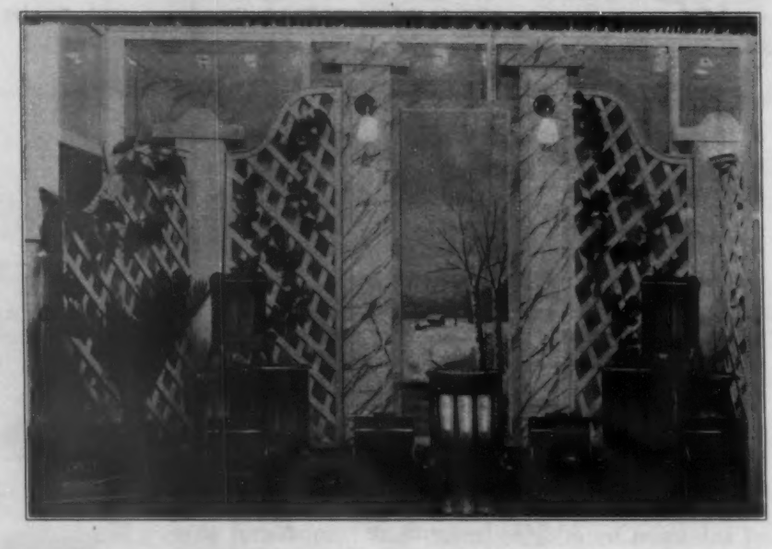
DO YOUR CHRISTMAS SHOPPING EARLY

The message of the electrical Christmas is being carried to each of the 50,000 customers of the Utah Power and Light Company by this letter. The useful list at the side suggests numbers of possibilities in the way of welcome gifts which might otherwise never have occurred to the harrassed Christmas shopper, while the letter serves as a reminder to shop early.

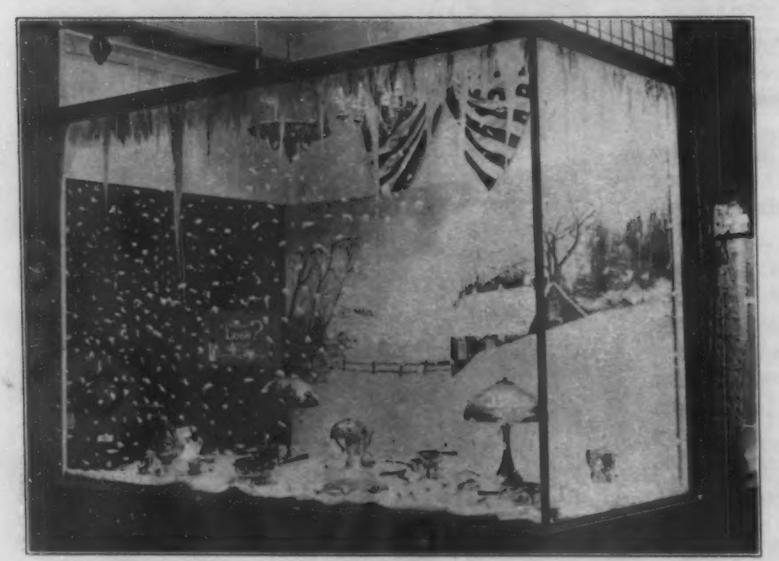
Christmas Windows Far and Near



The brilliantly illuminated Christmas tree in the windows of the Electric Light and Power Company of St. Joseph, Mo., is a resplendent landmark impossible to ignore, and carries the idea of the Electrical Christmas to even the most casual passer-by. Note the display of appliances in the foreground.



The warm glow of an electric heater against the cold background of a snow scene makes an effective contrast in the window of the Electric Light and Power Company, in Colorado Springs, Colo. With the addition of an artistic color scheme and careful lighting a most pleasing result is obtained.

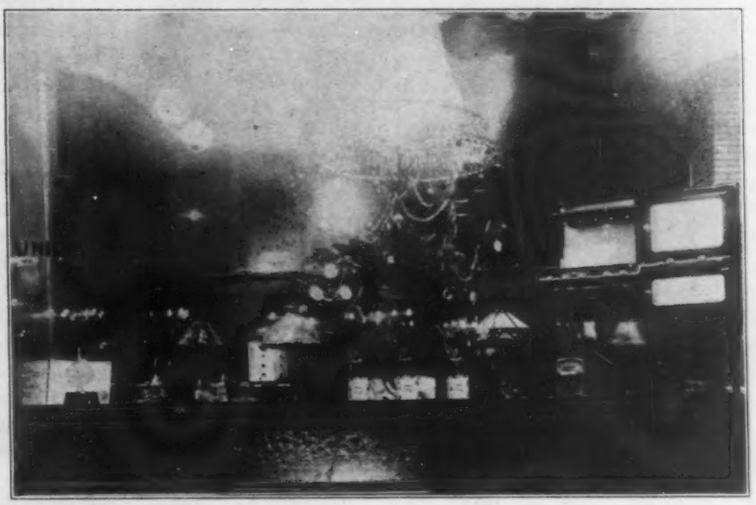


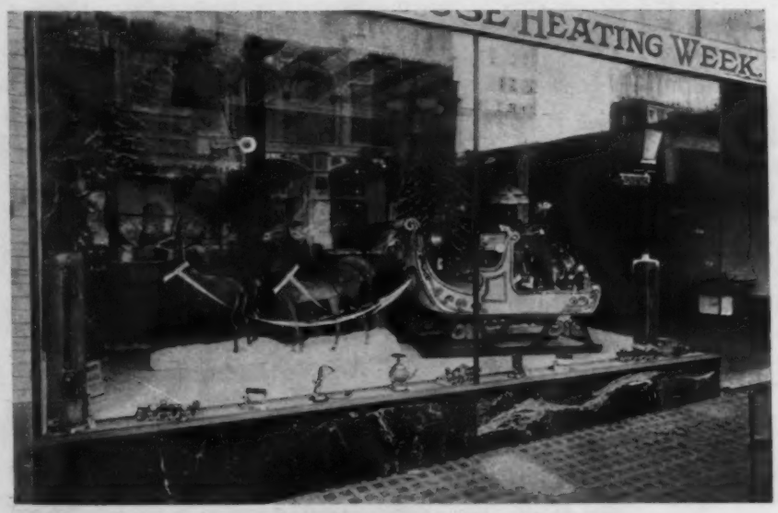
An effect such as is given by this Christmas snow scene in the window of the Rome Gas & Electric Light & Power Company of Rome, N. Y., is sufficiently striking to attract attention anywhere. Note the use of the icicles, and the way in which the white ground throws the appliances in to relief.

Promote the Sale of Electrical Gifts

A little revolving stage in a miniature theatre is the feature of this window of the Public Service Electric Company of Nework, N. J. In each one of the divisions on the stage is a doll operating an electric appliance such as a toaster or percolator, the turntable, driven by an electric motor, revolving to display each in turn.

The Union Gas & Electric Company of Cincinnati, Ohio makes use in this window of a striking illumination effect over a prettily decorated Christmas tree, with only a few appliances displayed. Even so undecorative a piece of furniture as an electric range has been successfully introduced without marring the appearance of the display.



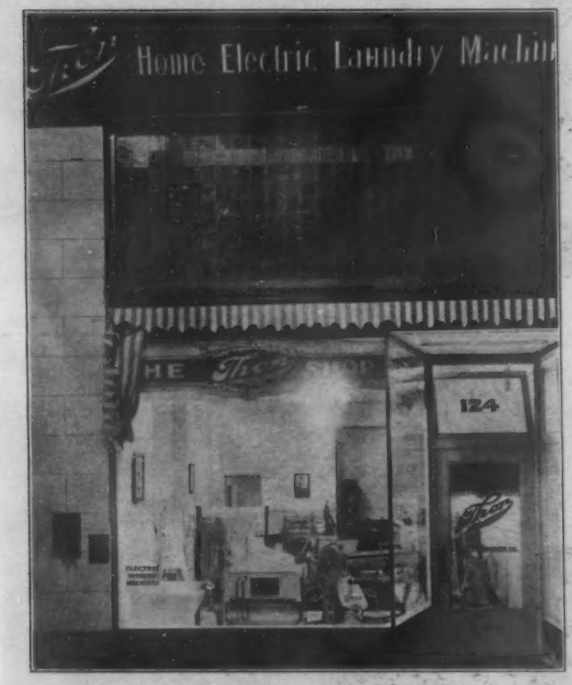


The figures in this window, which attracted much attention in San Francisco, are merely silhouettes cut out of cardboard and skilfully colored so that the illusion of form is created. The appliances themselves are carefully subordinated in the display, but when once the prospective customer has stopped the electrical gift idea is impressed upon his mind.

A Washing Machine Service Station

(A new store which cooperates with the established dealer instead of competing with him is the service-station institution described below. Incidentally this account of a specialized business affords a number of excellent merchandising hints to the retailer of washing machines. The Editor.)

"How does it work?" is the question most often asked by the housewife who sets out to buy an electric washing machine—and then the question is closely followed by others. "Where do you set it in the laundry? How do you get the water into it and out of it? Does the wringer wring off buttons?



THE ENTIRE STORE A WINDOW DISPLAY

The shop is illuminated and the machine kept in operation until 11 o'clock at night. The picture presented to the passer-by suffers in no way by comparison with the displays of the department stores and jewelry shops which are characteristic of the neighborhood.

Do the clothes come clean?" The electrical dealer has not always the facilities at his command to stage the demonstration which will satisfy the customer's questions, nor in many cases, the stock which will show her the size and type of machine in which she is interested.

In some cases the jobber has put his larger assortment at the dealer's convenience and it is possible for the conveniently located retailer to put on his hat and conduct his customer over to the jobber's salesroom to inspect the various machines there on display. Occasionally the dealer is in a position to have his demonstrator call at the prospective customer's residence and to get out one week's family wash. A still more effective means of demonstration, however, is that inaugurated by the Hurley Machine Company in the service station recently established by them at 124 Post Street, San Francisco.

Not a Regular Retail Store —

This is one of a series of Thor Shops which are being established throughout the United States and marks a distinct departure in the merchandising of electric washing machines. Here is kept a complete assortment of Thor machines of all sizes and types, as well as ironing machines and vacuum cleaners. It is in the heart of the shopping district and attracts many people from among the passers-by, as well as caring for the prospects brought in or sent in by the dealers themselves.

It is intended purely as a service station, in no way competing with the dealer, or with the jobber in the field. The Pacific States Electric Company is the distributor of the Hurley Machine Company on the Pacific Coast—indeed all machines sold in the shop are purchased from the Pacific States stock, in order not to disturb the channels of trade. The Pacific States Electric Company arranges with its out of town dealers for the follow-up of the many inquiries which the Thor Shop originates.

It becomes possible for the dealer to secure skilful assistance in dealing with difficult sales problems. The shop is more conveniently located than any jobber's establishment could be, for such service, being in the very heart of the best shopping district, and is in itself an inviting place to go which has already probably caught the customer's eye.

Attractive Appearance —

Located as it is, next door to the most exclusive women's furnishing establishments, it in no way suffers by comparison in its fittings and general appeal. The floor is a clean tile, partially covered by a rug which serves the dual purpose of offering a base for vacuum cleaner demonstrations and of indicating the possibility of doing the washing even on a rug without damage. The walls are a sunny buff and are relieved from bareness by framed pictures of washing machine posters and cards which carry out the idea of the shop and provide a decorative

A CONTINUOUS DEMONSTRATION

The household articles displayed on the clothes horse were actually laundered in the shop. A demonstration of either washing or ironing is always in progress, with five or six interested witnesses who were attracted by the opportunity of learning the mysteries of washing in this unruffled and uniaborious fashion.

feature as well. One each of every type of machine is represented, one of the larger washers being connected up near the window with laundry tubs and taps and in constant operation. This serves at once as a window display and as a convenient place for demonstrations.

Demonstrations —

A competent demonstrator is continually at work, getting out a day's washing from the wash basket to the finished product of the electric mangle.

He Saved $600
By Getting a Thor
Electric Washing Machine
No Belts to Break
—or slip—or catch your clothes
Tested and Approved by Good Housekeeping Institute
Every housewife—every MAN of the home—should read the following letter:
$11 Per Month
Only a small amount down —then monthly payments.
We have made it so easy to get a Thor that no housewife should be without one. Easier on clothes than the wash board. Washes clothes just as clean. 300,000 women of America own Thor Electric Washing Machines.
But be sure you get a Thor—the machine that has the Safety Wringer Release and the Self-Cleanable Wooden Revolving Cylinder, combining the utmost cleanliness with the least possible wear on clothes.
Telephone for Demonstration
The Thor Electric Shop
Hurley Machine Co.
124 Post St., San Francisco
Guaranteed by Hurley Machine Co.

USING THE NEWSPAPERS

The electric washing machine idea is being presented to the public through extensive newspaper advertising. A series of salesletters is also going out to a selected list of prospects which are then followed up by telephone calls and personal appointments.

All this is carried out under most favorable conditions. Where a demonstration is conducted in a home, the laundry is often not conveniently arranged —or there is none at all; the machine is not set up with permanent connections—and other difficulties of the householder's arrangement may interfere. Here in a light, sunny room it is possible to show off the machine to its best advantage, and at the same time to lead the prospect on to consideration of other electric devices to complete the modern home laundry. Actual laundry work is undertaken, not the least of the attractions to the passer-by being the neat display of carefully ironed garments

Customers Attracted —

It is surprising what interest is shown by the public at large. The moving soap suds and the busy cleanliness of the shop attract the woman who has been thinking of buying a machine but hasn't gotten down to it—and even the woman who hasn't known electric machines were available in small enough sizes for household use. Besides these casual visitors, the customers are sent in by the dealers themselves and also a selected list obtained through letters and telephone calls. The electrical subscribers of the central station form the basis of the list. The letters are followed up by telephone and if an interest is shown, by personal appointment. So successful has been this method of procedure to date, that the shop is almost always busy, there being usually five or six customers being initiated into the pleasant mysteries of the wash. An average of 12 to 20 out-of-town leads per day is no mean showing. In each case the dealer's name is recorded and kept on the prospect's card in file, so that even if a purchase is made six months later, the dealer is properly credited. In some cases the customer is turned over to the local dealer after a demonstration, in others the deal is consummated through the Thor Shop.

Cooperation with the Dealer —

The avowed purpose of the shop is, as expressed by the manufacturer, to give better service and sales cooperation to the dealer, with a view to bettering the merchandising of household labor-saving devices. Arrangements are being made by which the dealer may send in his salesman for a day's experience in the Thor Shop where he will be given the benefit of training in the special salesmanship of these devices.

An extensive campaign of newspaper advertising has been undertaken. The idea is to keep the electric washing machine as a possibility for comfort in the home constantly before the housewife—and the problem has been attacked in no haphazard way but with definite plans ahead of a year's scope.

As an attention compelling feature, however, the shop itself is its own best advertisement. During the day, the continuous entertainment of the demonstration attracts the attention of almost every passer-by, and at night the illumination of the pleasant interior is the brightest on the block. The moving mechanism of the washing machine is kept in operation until 11 o'clock—and there is always some one who finds the exhibit interesting enough to stop before it for an extended examination.

A Growing Demand —

It is interesting to note that over $14,000,000 worth of washing machines were sold in the United States last year, dollar for dollar a greater sum than was expended for electric irons in the same time.

The San Francisco Thor Shop is but one of a series of service stations which the Hurley Company is establishing to help the dealers take advantage of the anticipated increase in demand. Similar stores have been opened in Los Angeles and elsewhere throughout the country.

Potential Publicity

BY S. M. KENNEDY

(The commuter will read the magazine advertisements, the woman shopper will read the street car cards. For thorough-going publicity all types of mediums must be used, says the general agent of the Southern California Edison Company in this third article of his series on public utility practice.—The Editor.)

In the conduct of a central station business, the subject of advertising is one that should receive as much thoughtful consideration as any other part of the organization's work. Good advertising is as useful to an electric company as it is to a department store and may readily be developed into one of the mainstays of the business. However, the methods

ELECTRIC COOKING
YOU ARE CORDIALLY INVITED TO ATTEND A DEMONSTRATION OF ELECTRIC COOKING BY THE NATIONALLY FAMOUS CHEF, A. L. WYMAN IN OUR OFFICE, 156 PINE AVENUE, CORNER BROADWAY, EVERY AFTERNOON AND EVENING FROM JULY 6TH TO JULY 8TH, 2 P. M. TO 5 P. M. AND 7:30 P. M. TO 10 P. M.
BEGINNING JULY 10TH TO JULY 14TH, EVERY AFTERNOON FROM 2 P. M. TO 5 P. M. THURSDAY EVENING, JULY 13TH, 7:30 P. M.
IF NOT CONVENIENT TO ATTEND, TELEPHONE SUNSET 845 OR HOME 33 AND OUR REPRESENTATIVE WILL CALL
SOUTHERN CALIFORNIA EDISON COMPANY

An advertising card which appeals to the housewife and is not likely to be overlooked or ignored when once arrived at its destination

and mediums used by the department store may not be the most effective if applied to the electric company's business, and it becomes a problem or rather a study as to what direction a central station should follow, when spending its yearly advertising appropriation.

Classifying the Public

If we take it for granted that the Management acknowledges the importance of advertising, the question arises, "What are the best methods of publicity?" Probably more than anyone else, the man who advertises must put himself in the place of those whom he wishes to reach. With this idea before him he will understand how to attract the attention of the public, where to place his advertisements, and when the psychological moment arrives to produce the best results. Now, advertising of any description must attain its object by a well-defined process. In the first place it must awaken attention; next, promote inquiry; then arouse desire, and, finally, create a demand. Again it may be asked, "What is the best method of doing all this, and increasing the sale of electricity?" For the reason that the public cannot all be reached through the same channels, it follows that in various ways, all honest advertising is good. Some people never look at the advertisements in the daily papers, but will eagerly scan each advertising page in a magazine. Others never observe an advertisement in a periodical, yet their eyes catch the announcement on a bill board or the card in a street car. Again, there are others too absent-minded to note anything on bill boards or in a street car, but, put a circular or letter in their hands, and it will be read from beginning to end. Consequently, if it is the desire to reach all classes, every reasonable method of attracting attention should be used. It may not be desirable to go after all classes of people at once, but the medium of advertising most adapted to reach each class should be used at a time calculated to produce the best results.

The Supremacy of the Newspaper

Effective electrical advertising should saturate the community and forcefully emphasize some definite objective. Failing in this it is incomplete and its compelling element is endangered and sometimes lost. Advertising, like literature, poetry, music, drama, art, oratory, and preaching, is not an exact science, and no theory of metaphysics can determine with anything approaching exactness the mental impression it implants. Newspaper advertising, however, in its far-reaching scope, so far preponderates all other mediums of communicating with the public, that it takes first place. In segregation, other methods can be treated as intensive, stimulative and auxiliary. The number of people who receive and read a

Striking folders which are easy to distribute and which arrest the attention immediately. The initial announcement, the phrasing, the color of the cover all play their part in arousing interest

newspaper is the first consideration which an advertiser gives a publication when contemplating its use in presenting his proposition to the public. Generally speaking, this is a correct hypothesis, but it is subject to many modifications. Duplicate circulation, while it may not be an entire loss, is not scientific or economical advertising. Quite a large percentage of people read both evening papers and morning papers, but the ratio is not sufficiently high to justify an advertiser who wishes to reach every home in his community in discriminating between them. The Sunday papers in the larger cities running from 100 pages up have enormous circulations, but it may be accepted as fundamental that as the size of the paper increases, the proportion of its advertising matter

which is read, decreases. Selecting the best position on the page of a newspaper on which an advertisement is to appear and choosing the page where it will be most apt to be read by the readers the advertiser desires to interest is a subject for thoughtful study. The type of copy—the nature of appeal,

EDISON ELECTRIC HOLIDAY GIFTS
Gladden and Lighten the
Whole Year 'Round
IT IS WISE TO ORDER NOW TO SECURE PRE-HOLIDAY DELIVERY
Southern California Edison Company

The newspaper is the medium of advertising through which the largest number of persons may be reached. It is essential, however, that a newspaper advertisement should dominate the page on which it appears

should be made to conform to the position of the advertising. It is obvious that advertising positioned on a women's page, should have different treatment from that on a baseball page.

Central Stations and Cooperative Publicity

The electrical industry is just beginning to enter the advertising field, with the prospect of quickly becoming one of the greatest, if not the greatest, patrons of printing ink in the world. That it has not done so sooner is due to many reasons, among them being that the demand for electrical installations was so great and so spontaneous that advertising was not deemed necessary. The problem of the central station companies was to finance the construction of generating plants, transmission and distribution lines, in order to keep up with the multiplying demand of the public. But as the business developed and the size and number of generating stations increased, the question of scientific load-building had to be considered, so that the product of these plants should be constantly used, and here is where advertising stepped in, and worked to advantage. Today, an era of cooperation has been reached by means of which the various branches of the industry — the central station, the manufacturer, the jobber and the dealer — are working together for the benefit of all interested, including the general public. The time is at hand when electricity may be sold through advertising as freely as any form of merchandise, and united efforts in that direction are already producing wonderful results on the Pacific Coast.

In the West, the central stations were the pioneers in electrical advertising. They took up the work of the advertising and selling of electrical appliances before there were any electrical dealers in the territory who were interested in their sale and use. They did it, not because they desired to enter the appliance business, but because it was necessary that they take the initiative in order to blaze the way for future business and the development of the central station's load.

It is due to the initiative of the central station companies that the use of electrical appliances became popular, and in nearly every town of importance in California dealers with well equipped establishments are now conducting thriving businesses. Through cooperation, the manufacturers, jobbers and contractor-dealers have now become substantial advertisers, and the character of central station advertising is undergoing a change. Instead of promoting the use of any special device or appliance, the central station company's advertising is now turning toward more general educational lines, emphasizing the many advantages of electricity and the benefits derived from electric service supplied through modern methods of distribution.

Advantages of the Large Space

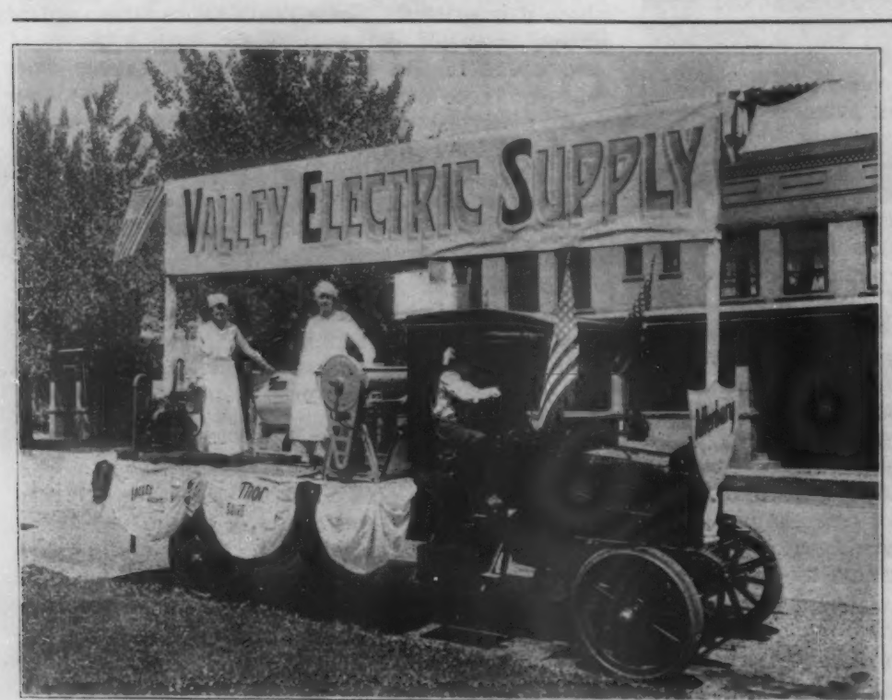
It is obviously the duty of central stations to patronize the local papers in their respective communities, not only because they are good mediums for advertising, but also because they must be regarded as institutions of their respective cities and towns, and classed with chambers of commerce, boards of trade and promotion associations. Large space advertising is necessary nowadays to bring big results. Once a double column four-inch advertisement was believed to have drawing power, but a very careful keying of these small announcements proved conclusively that they could not be depended upon to produce any results in a sales campaign. Department stores and all of the larger advertisers have found by experience that an advertisement, to have selling quality, must dominate or occupy the page upon which it is printed. Some years ago a large central station company, doing business with a group of newspapers in the territory which it served, was obliged to take the initiative in introducing the lamp socket electrical appliances to its consumers, because the few dealers in the field were not in a financial position to carry on a comprehensive promotion campaign and the manufacturers were advertising almost exclusively in national publications. This company had previously followed the conventional plan of using a small advertisement in daily and weekly papers in its territory, but continued changes of copy and carefully watching for sales showed with practical conclusiveness that this method of advertising had no selling value worth mentioning.

Accumulative Advertising

This company offered a manufacturer a very large order if he would construct a certain electrical appliance, which it was believed would eventually become a necessity in every home, if offered at a popular price. As it was necessary to sell the utensil at cost, the company could not afford to boost it with a large additional advertising appropriation, and the problem of accomplishing the desired result without increasing expenditures was referred to the advertising manager. After studying the situation, he

proposed a plan which at the time was original, but has since been adopted by a number of central stations and utility corporations, and is known as "The accumulative advertising system." It consisted of an arrangement to take the total money value of the advertising which the company had paid to newspapers during the previous year; figure this amount into the number of column inches of advertising which it would purchase at the column inch rate during a calendar year, and divide the annual payment into twelve monthly instalments. The plan has now been working successfully for eight years, the advantage being of turning the small space advertising of negligible value, into a valuable asset by making it possible for the company to run page and half-page advertisements whenever it desires. The very first appearance of this large advertisement showed its drawing power, and within three months the sales of the appliance which the company was promoting had exceeded expectations by many thousands, and has now become a thoroughly standardized utensil and one of the principal articles now sold by electrical dealers. The accumulative system as it is operated by this company is believed to be the simplest form of carrying advertising accounts with a large number of papers. On the first of each year, the amount of the annual appropriation for each of the 140 newspapers on the company's system is worked out into column inches, as for example: a newspaper appropriation of $20 per month, or $240 a year, with an advertising rate of 20c per column inch, is entered on a loose leaf bills payable ledger sheet. At the top of one column is placed the 1,200 column inches of space which the annual appropriation purchases. The company has a drawing account against the paper for 1,200 column inches of newspaper space per year, and it can be consumed in anything from page advertisements down to one-inch notices as the requirements of the business may demand. As this space is consumed, the advertising agent turns in the clipping of the advertisements to the auditing department, with the number of column inches, accompanied by a blank which shows whether it is chargeable to stock sales, new business or other purposes, and these column inches are recorded in their proper places on the cards. At any time the advertising manager can see by looking at the ledger sheet of any paper just how many column inches stand to the credit of the company for the remainder of the year, and can so arrange that his last advertising, which is usually the Christmas advertising, exactly consumes whatever space remains in the paper at the last of the year. Instead of reducing the advertising appropriations for the papers, this system has shown that large advertising space is distinctly advantageous and has resulted in general increases. There is nothing in the plan which presents additional appropriations for papers in which advertising has proven profitable. The column inches made on the first of the year can be increased, when the selling power of the paper shows that its space is valuable to the company. It is possible for the advertising manager to tell which papers are bringing results from their advertising, and to increase the company's patronage accordingly. It also gives an initiative to publishers to assist the electrical industry by news items, which tend to make the advertising more profitable, and in turn to increase its use by the central station company.

The second part of this article, appearing in our next issue, will take up advertising by billboards, electric signs, moving pictures, folders, circulars, follow-up letters and bills.



An attractive display float entered by the Valley Electric Supply Company won first prize recently, in a street parade at Yakima, Washington, amid hot competition. On the platform of a delivery truck, trimmed in gay bunting, were a gasoline driven dynamo, a Thor Electric Washing Machine, and a Thor Electric Ironer. Two neatly dressed operators demonstrated the latest wrinkles in the operation of these home labor saving devices to an interested crowd. Not only did the float capture the highest award of the parade, but it resulted in a substantial increase in orders received for the Thor electrical devices which this company features.

The Electrical Household Appliance Business

BY PHIL G. GOUGH

(The enterprise of department stores in the selling of electrical household appliances should be met by the contractor-dealer not with complaint but with increased effort and originality. The best machinery for this great business is all at the disposal of the electrical merchant, and the way to take advantage of its tremendous possibilities is here pointed out by the president of the firm of Listenwalter & Gough of Los Angeles.—The Editor.)

The rise of the greatest branch of our industry, the electrical household appliance business, is marked by the advent of the "electrical merchant." True, the "electrical contractor" is many years old and has accomplished great things for the industry. Along with his laborious duties of installation, wiring and construction he has, in many cases, stubbornly held the picture of the "electrical household" before him. From the contractor, holding this vision, sprang the contractor-dealer. While in the great majority of cases the contractor-dealer's primary interest has been in the construction end of his business, he has almost invariably displayed a disposition to improve his store and reach out as best he could for retail sales.

In every national publication that finds its way into the home the electrical household appliance announcements predominate. No longer do we gasp for breath when an appliance manufacturer states proudly that his advertising budget for twelve months will be $100,000. It is a well known fact that the larger manufacturers of electric clothes washers are spending millions in national advertising and sales helps for their dealers. No longer are double-page electrical spreads in the weeklies having the largest circulation an exception, for they appear in every issue, and the 7,000,000 electrically wired homes throughout our country are now enthusiastic readers and believers of these attractive advertisements.

With the birth of this gigantic business, appears the electrical merchant. Certainly, the electrical merchant still has a contracting department in his institution, but his importance in his field is no longer gauged by the amount of No. 14 wire he purchases or the carloads of pipe he installs. His reputation is established only by the number of household appliances he sells into the home in an ethical merchandising manner.

The Contractor-Dealer's Opportunity —

Fortunately, in many localities the established electrical concerns have grasped the vision of the household electrical appliance field, realized its tremendous possibilities now, and have a conception of its future growth with each coming year. However, it is also a regrettable fact that many established electrical dealers have been too slow in seeing this vivid picture and, as a result, the hardware or department stores have reached out to monopolize the business. In some cases new men have stepped in with electrical household specialty shops and have picked the plum while the contractor-dealer looked on.

Surely the sale of electrical appliances for household use is the greatest opportunity that exists today in a business way. The electric clothes washer, vacuum cleaner, range, ironer, dishwasher, etc., are articles that should be in every electrically wired home in our country. These appliances are things that all homes not only can afford to install—but cannot afford to be without. It has been clearly demonstrated by actual selling experience that it is the home of moderate means, where the mothers are brought directly in contact with the daily drudgery, that these appliances are received with the greatest enthusiasm. This business will grow in the next few years to proportions that are amazing to those who have not carefully looked into the future. A moment's thought will convince you that in only a few short years the old-fashioned rub board will be discarded entirely for the electric clothes washer, the dust-raising broom for the efficient vacuum cleaner, the gas stove for the pleasing electric range, while the adoption of the electric ironer and dishwasher will be universal.

Going After Business —

The electrical merchant realizes that, regardless of extensive national campaigns, he cannot expect to sit in his store and deal out these labor and money saving devices as the "hot dog" merchant does at a Sunday ball game. First of all, he himself must be vigorous and enthusiastic upon this subject. He must inspire his employes with the spirit of this business and send them with a message to each household. If he will study the educational books offered by the leading appliance companies on this subject and read the monthly bulletins put out by them, he will soon find himself developing into a real sales manager.

Secondly, he must advertise—he must have a definitely planned advertising schedule, for advertising in a haphazard manner without a plan or purpose is money wasted. In order to have a plan, a dealer should set aside an advertising budget. Upon close investigation, the following figures have been arrived at as being correct on the average. If your city has 50,000 people, the scheme will work out as follows and would work out proportionately with any number of people:

5 clothes washers	to	every	1000	population	—250	total	for	yr.
7 vacuum cleaners	"	"	"	"	—350	"	"	"
1 ironer	"	"	"	"	— 50	"	"	"
1 dishwasher	"	"	"	"	— 50	"	"	"
1 range	"	"	"	"	— 50	"	"	"
2 sewing machines	"	"	"	"	—100	"	"	"

These figures, of course, are based upon lines that are advertised nationally in a big, distinctive way and present the biggest value to the purchaser. It would be impossible to accomplish this with other than the leading lines of merchandise. With the

above picture to work from, the Electrical Merchant then makes his advertising budget as follows:

$3.00	for each	washer.....(250)	$ 750.00
1.00	" "	vacuum cleaner..(350)	350.00
3.00	" "	ironer .....(50)	150.00
2.00	" "	dishwasher .....(50)	100.00
3.00	" "	range .....(50)	150.00
1.00	" "	sewing machine..(100)	100.00
			$1600.00 yearly advertising fund.

The money must go in tying the national advertising to Mr. Electrical Merchant's store, and his results will depend on these three factors: consistency, continuity, and distinctiveness. The leading appliance companies are spending hundreds of thousands of dollars to help Mr. Electrical Merchant conduct his local advertising along these lines. Each one of Mr. Electrical Merchant's ads must connect up with the others in appearance and copy so that they will have a cumulative value. Up-to-the-minute manufacturers are willing to give these to the dealers that will follow this plan.

Helping the Customer —

Third, Mr. Electrical Merchant must sell on the deferred payment or installment plan. If sales were limited to those who could pay all cash or even a portion in cash the opportunity for sales would be limited, for very few homes have the cash on hand to pay the entire purchase price of an electric household appliance. This problem is solved by the leading appliance companies for the dealers, and certainly no electrical merchant can afford to tie up with a concern who does not offer him an ideal time payment plan to sell upon. The value of selling on time becomes more and more apparent as you get into it. It is ideal if you can offer appliances at the nationally advertised price without the addition for time payments. This plan has proven correct in the phonograph, cash register, sewing machine and other high class time payment sales schemes.

Mr. Electrical Merchant must take care of his own collections on time payment paper. This paper should never be extended over a year's period, and should be payable at least monthly. This will bring the new customer into Mr. Electrical Merchant's store at least twelve times a year, on which occasions she will become acquainted with his sales force—give him a prospect—investigate a new appliance and perhaps purchase it—buy her Mazdas—and become an enthusiastic purchaser, so that when weddings, birthdays, anniversaries and Christmas come, she thinks immediately of percolators, waffle irons, heating pads, toasters, etc. She will **not** get these ideas if you give her deferred payments to a bank to collect.

Fourth, Mr. Electrical Merchant must organize. He must have solicitors who arrange for demonstrations in the home. This work is most important. He must give service and good service to those who have purchased, for if they are kept satisfied, they will sell many appliances for the merchant each year with their enthusiasm. He must be forever using his ingenuity on window displays to tie in with his local advertising. He must use form letters and follow-up letters, hand out intelligently the literature provided by his factories, and give public demonstrations in his store. He should hold weekly sales meetings and be able to key his sales force to their utmost. In short, if the electrical merchant "gets in," and ceases dabbling, he will soon see the tremendous possibilities of this business, visualize its future growth, and tell the world that it is the greatest business on earth.

Western Ideas

THE DISAPPEARING PENCIL is a familiar sorrow in all offices. People have a communistic way with pencils, and seldom seem to realize that your pet pencil may be as treasured a possession as your umbrella. However, since it is almost impossible to prevent people walking off with the office pencils, it is well to make the lost one serve the firm in another way. The Pacific States Electric Company of San Francisco has its pencils stamped with its name, and the absent-minded visitor who wanders off with one of them automatically constitutes himself a publicity agent for the company.

Of course, he may go to the trouble of returning the pencil when he realizes where it belongs, but if he does not he is still benefiting the original owner every time he uses the pencil in public, or leaves it lying around, and even if he in turn loses it again. It carries its message everywhere it goes and pays for its loss with advertising.

SHELVES IN A SHOW WINDOW not only increase the available space for the display of appliances, but lend themselves to a great variety of effects in window decoration. The placing of the

The window of Chas. N. Shannon & Company of Denver, showing the use of shelves in the arrangement of the display

articles on different levels prevents a crowded effect, and insures a better view of each one. When all are at one level those in the background are likely to be overlooked. Various pyramid arrangements, interesting lighting effects and more varied color schemes are also facilitated by the use of shelves.

An All-Electrical Christmas

(This is to be an all-electrical Christmas. The dealers report an ever-increasing demand for electrical appliances as gifts, and the Society for Electrical Development has planned a comprehensive campaign to further the idea and draw attention to its Christmas possibilities. Here are some of the publicity plans worked out to assist the dealers.—The Editor.)

The Society for Electrical Development has announced a campaign to make this an All-Electrical Christmas. Representatives of the Society have just completed a survey covering sixteen states and the Province of Ontario, Canada, during which electrical conditions in every branch of the industry were studied at close range. In most cities the contractors, dealers, jobbers and manufacturers reported the greatest volume in their history. Manufacturers and distributors of electrical specialties, particularly, are far behind on orders; dealers in these devices are finding ready sale. As one retailer expressed it: "For the first time in the history of electrical appliance selling in this city people are coming into the store to buy large and expensive specialties, which heretofore we had to go out and sell with the hardest kind of selling."

One of the folders provided for distribution by dealers, containing numerous suggestions for electrical gifts.

Based upon this information, the Society has prepared complete and comprehensive sales and advertising material for holiday selling. This material will comprise a beautiful poster in many colors, colored leaflets, envelope enclosures, cards for counters, cars and windows, form letters and various other advertising matter. It is planned to distribute this cooperative help to the trade at large, as in the past Society campaigns.

The material includes the following:

1. **The Poster:**
   Partly owing to the strike but mainly because of its great success, the same poster design will be used this year as in 1917.
2. **Window Cards:**
   Including the poster design and a compelling sales message, in colors.
3. **Price Cards:**
   A set of 8 cards featuring electrical gifts that clean, cook, wash and iron, sew, light, etc. Complete ready for use, printed in colors on stiff cardboard.
4. **Poster Stamps:**
   Always popular and effective. Similar to the 1917 stamps; to be stuck on packages, letters, etc.
5. **Suggestive Leaflets:**
   Little four-page folders suggesting over a hundred electrical Christmas gifts. For distribution through mails or from the store. In two colors, with room for imprint.
6. **Printed Letters:**
   Two-color printed letters which will take the message "Give Something Electrical this Christmas."

In addition to these business getting helps there will be cuts for newspaper ads, lantern slides, motion picture films, newspaper items—everything to make dealer campaigns a big success.

The Society will gladly supply full details of the campaign and material upon request.

This is one of the sample windows designed by the Society for Electrical Development to aid dealers in the promotion of the All-Electrical-Christmas idea, and is included in the material and suggestions sent out. Note the poster in the background, and the use of Christmas boxes for packing up appliances.

The Washing Machine Campaign as a Business Builder

(Making a game of a campaign may bring phenomenal results. A washing machine campaign which succeeded beyond all calculations was recently conducted by the Utah Power & Light Company, and the methods used to maintain the enthusiasm are described here for the interest of all who are contemplating similar campaigns for the sale of appliances.—The Editor.)

Give a woman two "electrical" thoughts and one, almost invariably the first, will concern a washing machine.

Our experience has been that, outside of irons, no electrical labor saving device is in as great demand as the washing machine. For a number of years the popularity of the electric way of washing has been on the increase until at present the Utah Power & Light Company has reached the point where it can

"O Ho! says Pa Lectrik "so this is the way they do it now. Pretty easy, pretty easy, say I, for Mrs. Lectrik."
"Wash day is here— Hooray! Hooray! shout the little Tricks —"Snap the switch" away we go!"
"Now chesks for me" Chuckles Ma E. Lectrik as the New Life motor begins to hum.
Here They Are Again!
Pa E. Lectrik, Ma E. Lectrick and the little Tricks—all ready to show you how to have the help and happiness of COMPLETE ELECTRIC SERVICE IN THE HOME.
And after this whenever and wherever you see the E. Lectricks you will know they stand for all that COMPLETE ELECTRIC SERVICE IN THE HOME stands for—comfort and cleanliness, less work and worry and a saving of food, fuel, time and money.
"For," says Ma E. Lectrick, "you've no idea how simple and really economical electric service is. It's better than any hired girl because it does so many things at once and it's always ready. It cooks and sews and washes and irons and cleans—all so quickly that I have plenty of time to enjoy myself with Pa E. Lectrick and the little Tricks. And then," beams Ma, "there's always my electric vibrator to keep me perked up and looking my best."
"Remarkable," adds Pa E. Lectrick. "Remarkable and very reasonable, too, say I, with the easy payments and the thrifty operation."
"Just a snap!" about the little Tricks.
During the month of March you can buy an Automatic Washer for $5 down and $5 a month, and it costs only 1½ cents an hour to operate.
We will be pleased to demonstrate any of the new electrical appliances that so cheaply contribute to the happiness and comfort of the home.
Utah Power & Light Co.
"Efficient Public Service."
Kearns Building. Wasatch 500

One of the attractive newspaper advertisements used in the washing machine campaign. Advertisements to be successful must catch the eye, and hold the attention continuously, and a story device of this kind is very effective.

boast one washing machine for every five residence customers on its lines, which, considering the rather high cost of the machines, is quite remarkable. Moreover, the company's 52,558 customers are scattered through some 180 communities, practically all very small, extending from southeastern Idaho, through northern and central Utah to southwestern Colorado.

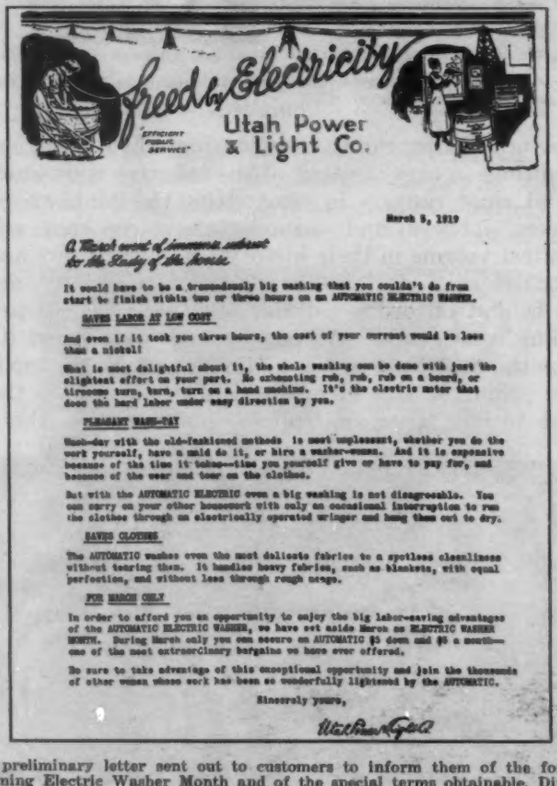
One feature which is responsible for this condition more than anything else is the company's policy of a concerted drive on washing machines during a limited period each year. The campaign for 1919 was conducted during the month of March and proved by far the most successful ever attempted.

J. F. Derge, Sales Superintendent, who had charge of the campaign, believes that the best incentive for a campaign of this kind is to furnish a mark to shoot at and then endeavor to over-shoot the mark. In the case of the March drive the mark was 744 machines (the number sold during a two months campaign the previous year), the idea being to beat this figure in one month during 1919. The fondest hopes of every one were more than realized when the final count showed a total of 977 machines sold during the month with total receipts of $82,631.00.

Details of the Campaign —

"Five Dollars Down and Five Dollars a Month" was the advertised feature, although no reduction was made in the regular selling price.

Central stations have a decided advantage in reaching customers direct by mail advertising, it being merely necessary to circularize its regular billing list, which list is always up to date, with an assurance that each letter will at least reach the prospect. This class of advertising was used extensively during the washing machine drive, the manufacturer cooperating in a splendid way both in circularizing customers from the factory and also in sharing in the expense of local newspaper advertising, which was also used liberally in all papers published in the company's territory.


Freed by Electricity
"Efficient Public Service"
Utah Power & Light Co.
March 8, 1919
A Timely word of Economic interest for the Lady of the House
It would have to be a tremendously big washing that you couldn't do from start to finish within two or three hours on an AUTOMATIC ELECTRIC WASHER.
SAVES LABOR AT LOW COST
And even if it took you three hours, the cost of your current would be less than a nickel!
What is most delightful about it, the whole washing can be done with just the slightest effort on your part. No exhausting rub, rub, rub on a board, or tiresome turn, turn, turn on a hand machine. It's the electric motor that does the hard labor under easy direction by you.
PLEASANT WASH-DAY
Wash-day with the old-fashioned methods is most unpleasant, whether you do the work yourself, have a maid do it, or hire a washer-woman. And it is expensive because of the time it takes—time you yourself give or have to pay for, and because of the wear and tear on the clothes.
But with the AUTOMATIC ELECTRIC even a big washing is not disagreeable. You can carry on your other housework with only an occasional interruption to run the clothes through an electrically operated wringer and hang them out to dry.
SAVES CLOTHES
The AUTOMATIC washes even the most delicate fabrics to a spotless cleanliness without tearing them. It handles heavy fabrics, such as blankets, with equal perfection, and without less through rough usage.
FOR MARCH ONLY
In order to afford you an opportunity to enjoy the big labor-saving advantages of the AUTOMATIC ELECTRIC WASHER, we have set aside March as ELECTRIC WASHER MONTH. During March only you can secure an AUTOMATIC $5 down and $5 a month—one of the most extraordinary bargains we have ever offered.
Be sure to take advantage of this exceptional opportunity and join the thousands of other women whose work has been so wonderfully lightened by the AUTOMATIC.
Sincerely yours,
Utah Power & Light Co.

A preliminary letter sent out to customers to inform them of the forthcoming Electric Washer Month and of the special terms obtainable. Direct mail circularization is a reliable way to reach prospective customers.

Close cooperation between the general sales organization and the men on the firing line, also with the credit and delivery departments, is one of the real secrets of the success of a drive of this kind.

Every cog must function properly so that each department can intensively follow its own work, without being hampered or concerned by delays or mistakes in some other department, which, of course, would slow up any campaign.

To Keep the Interest at a High Pitch —

During the campaign, reports were received daily by mail, telegraph and telephone from each office as to the number of machines sold. From these reports bulletins were prepared at least every week and sometimes oftener, showing the progress made. Such reports have a tendency to lift the work of selling from an uninteresting task to a pleasant game in which all are anxious to help win, and who does not enjoy the spirit of a game?

Progress report letters were sent out to salesmen, the third week's letter reading as follows:

To Division Managers, Sub-Offices and Salesmen:
Subject: Automatic Washer Campaign.

First Week	194
Second Week	172
Third Week	191
Fourth Week	?

Total Campaign — At least 750

From the above figures you can easily calculate the number of machines you will have to sell in order to obtain the object of our campaign. The two months' campaign of a year ago totaled 744 machines. From the results secured during the past three weeks it would seem that the mark of the two months can be obtained in one month this year without extra effort. The question now is, how much over the 744 machines will we go by the end of the month.

Let's try to attain a Record Day, a Record Week and a Record Month, all to be secured by the results obtained in our efforts during the last week of the campaign. We feel confident that this can be done chiefly because of the intense interest of the public which still exists in our attractive campaign feature. It has always been the experience of the past that the real impetus of the campaign is acquired in the last week.

The result of the three weeks of the campaign are as follows. You will note that the number of machines sold is well up with those of the other two weeks.

	Idaho Falls	Logan	Ogden	Bingham	Park City	Provo	Salt Lake	Western Colorado	TOTAL
Automatic No. 2	....	....	2	....	....	....	1	....	3
Automatic No. 4	8	20	20	....	....	8	27	3	86
Automatic No. 6	....	1	9	....	....	....	8	3	21
Automatic No. 10	4	7	23	2	....	3	34	....	73
Total—3rd Week	13	28	60	2	....	12	70	6	191
Total—2nd Week	13	28	42	2	7	24	48	8	172
Total—1st Week	18	19	47	5	5	23	71	6	194
Total—Three Weeks	44	75	149	9	12	59	189	20	557

Valuable "Bi-products" —

Does the average dealer object to the conducting of such campaigns by the central station? Apparently not. Reports from dealers in the Utah Power & Light Company's territory indicated that their washing machine business was greatly stimulated by the intensive advertising of the power company.

Another valuable feature of such a campaign, aside from immediate results, is the effect it has on sales of the particular appliance advertised for several months following the campaign, and also increasing the sales of all kinds of electrical devices, no doubt due to an appreciation through education of the immense labor saving qualities and comfort of the "electric way."

The Public Library for the Business Man

(It is not only the Business Library which is helping to solve the problems of the business man: the Public Library is constituting itself an invaluable aid by catering extensively to the commercial and technical needs of the community. The following account of the activities of the Seattle Public Library will give some idea of the extent of this service, and the methods by which it is brought home to the public.—The Editor.)

"For Information—Think Public Library first! You get the last word on any subject—Trade statistics — Business methods — Manufacturing processes." In this wise does the Seattle Public Library advertise its service to business men. Due to its location in the center of the business section of the city, the central library is able to offer the business man the service which in many public libraries is rendered through a business branch. This work is carried on through the technology room and general reference room. The one constitutes a technical reference bureau and a book laboratory for research of a scientific nature, the other a statistical and commercial information bureau.

As such, the Seattle business man depends upon the library to secure for him certain types of information. A question arises during the course of the morning's business, it may the London price of tin, or the amount of wheat exported during the year. He does one of three things: sends his stenographer to secure the information, drops into the library himself during his lunch hour, or better yet, calls on the telephone and gets the data without leaving his office.

Variety of Demand —

A busy day in the technology room finds a prominent banker looking into the feasibility of manufacturing silk in Seattle; a local exporting firm interested in methods of exterminating the Mediterranean flour moth; an out-of-town geologist studying the oil deposits of an adjacent oil field; the advertising agent for a local milk concern reading up on the chemical composition and food value of milk; a mining engineer looking into mineral resources of Siberia; and a local chemist working on the identification of some Oriental beans.

Books for home use are lent as well, on such subjects as scientific management, business correspondence, office organization, filing, advertising, accounting, credit systems, show-card writing, and salesmanship.

The technology room shelves a reference and circulating collection of 23,000 books on scientific and technical subjects, the scientific and technical society publications and periodicals, and the federal and state documents of value for technical reference. The current periodicals, about 200 in number, furnish the up-to-date information necessary to the business man or engineer if he is to keep in touch with the advances being made in matters connected with his specialty. Certain of these periodicals—the Official New York Metal Report; the Oil, Paint and Drug Reporter; the Engineering and Mining Journal; and the Iron Age—are consulted daily for

their market prices; even the advertising columns are useful to the man with something he wishes to buy or sell.

The collection of engineering handbooks is a mine of condensed technical information. There are compilations of the technical data, formulas, and tables most needed by the practicing civil, mechanical, electrical, or mining engineer. An engineer does not always care to own all the handbooks which he at times may wish to consult. He will have certain ones in his office, and for the occasional reference to the rest, he goes to the library.

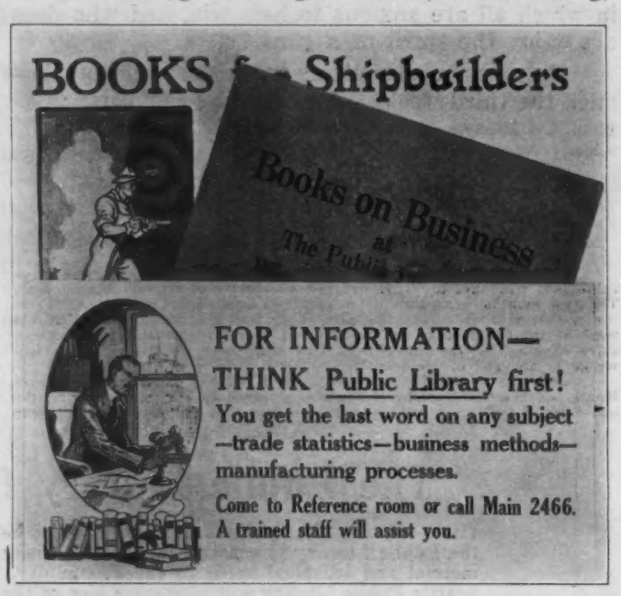
The library building at Seattle

Meeting Local Needs —

Library service to the business man tends to proceed in certain directions, these being the more important industrial and commercial interests of the city. Seattle is primarily a port and many commercial enterprises of the city exist because of this. The interests of importing and exporting firms are as diverse as are the commodities they handle. "What are the regulations governing the importation of this produce" and "What are the economic uses of that" are questions asked continually. Or the representative of an importing firm comes to the library with a bill of lading recording the shipment of so many barrels of something with a strange name. He asks, "Can you identify this for me? And just what is its use commercially?"

The Technology room is constantly busy, large numbers of men of the most widely various professions finding it an indispensable source of information.

The utilization commercially of products passing through the port is a question about which the alert, far-seeing business man is thinking. For example, large quantities of vegetable oils are shipped through Seattle from the Orient. Daily the library puts the right books into the hands of business men working on the solution of the problem of using these oils in local industries. So the Technology Room is rich in material dealing with vegetable oils, their refining, their chemistry, their uses commercially. It also has books about the plants that are the source from which the oils are extracted, and their cultivation.


BOOKS for Shipbuilders
Books on Business
at
The Public
FOR INFORMATION—
THINK Public Library first!
You get the last word on any subject —trade statistics—business methods—manufacturing processes.
Come to Reference room or call Main 2466.
A trained staff will assist you.

By means of attractive posters the library spreads the word of its specialized service to all types of workers, emphasizing particularly those activities in which Seattle is mainly interested.

The collection of books and periodicals covering the subject of industrial chemistry has been built up to meet the ever increasing requests that come from chemists and manufacturers. It is surprising how great a number of manufacturing processes are chemical in nature, or are dependent at certain points upon the knowledge of chemistry.

To advertise the library's book service to the city's biggest industry—one employing 2,900 men—there has recently been put up throughout the shipyard sections of Seattle an attractive poster, announcing "Books for shipbuilders and other skilled workers at the Public Library—why not use them and get ahead?" This is a case where service to the skilled mechanic is in a sense service to the business man.

Special Requirements —

Located in the center of a group of rich coal mines, and at the point at which Alaskan miners and engineers embark and disembark, Seattle is a center of mining interest. So the use made of the geological and mining resources of the Public Library is a large one. A complete file of the bulletins and topo-

graphic and geologic maps of the U. S. Geological Survey and the Mines Bureau, with the state and Canadian geological and mining reports, provides the mining engineer or the prospector with information which he could secure from no other source.

The Seattle Public Library has a well rounded collection of engineering and business books, and is endeavoring to keep step in a book way with the industrial development of the city it serves. It may be said that it is known in library circles especially for its advertising, and this extends to the advertising of business books.

SAN FRANCISCO ELECTRICAL DEVELOPMENT LEAGUE

BY HENRY BOSTWICK

(Electrical development leagues situated in the populous centers of the West are capable of vast possibilities in forwarding the electrical activities of the community. Here is an article by the San Francisco district manager of the Pacific Gas & Electric Company which tells of some of the accomplishments and aspirations of the San Francisco Development League when the author recently retired as its president after a most successful term of office.—The Editor.)

Among matters worthy of mention in connection with the recent work of the San Francisco Development League, is the action taken by the League in connection with the proposed amendments to the Industrial Accident laws which vitally affected electrical interests as a whole; also the matter of cooperating with the Department of Electricity, looking to the retaining of sufficient inspectors by the city covering the inspection of electrical installations.

The League's activities in matters of this kind should be continued and it should be the duty of the League to keep in close touch with all state and municipal legislation which in any way may affect the interests of the electrical manufacturer, jobber, contractor-dealer or central stations. This can be accomplished in no better way than by having committees whose duty it shall be to keep in touch with such legislation.

Participating in Civic Affairs

There is no good reason why the San Francisco Electrical Development League should not play as important a part in the civic affairs of our city as any other organization within our midst. I cannot conceive why the electrical industry should not be as much to the forefront in all local affairs as the Rotary Club, the Down Town Association, the Home Industry League, the Commonwealth Club and other similar organizations. The only reason that I can assign for the fact that the electrical industry has not been a prime mover in all such affairs, notwithstanding the fact that it is composed of shining lights, is that the objects of the League have not been brought clearly home to us all, and in order to bring them more forcibly to the attention of the members of the League, it would not be amiss to have Article 2 of our constitution and by-laws printed on a neat card and sent to all members, "lest they forget." The machinery to put the League in the place where it belongs, so far as our civic affairs are concerned, is at hand, and all that is needed to put it into operation is the appointment of the necessary live committees whose duty it should be to spread propaganda of the aims and objects of the League as laid down in Article 2 of our constitution and by-laws.

United Forces —

Now as to the recommendations made by the Public Policy Committee: they are all worthy of the very fullest consideration at the hands of the members of the League. To my mind too much stress cannot be placed upon the suggestion of the committee with respect to the consolidation into one electrical organization of all the several separate and distinct organizations now representing the electrical industry in our city, but whose aims and objects are all virtually the same, and when one stops to consider that in organization there is strength, one need only to pause and visualize for a moment what a powerful organization there would be if the several electrical organizations were moulded into one body, and I cannot help but feel that the effectiveness of such an organization would be more far reaching and accomplish better results for all concerned than are being accomplished at the present time.

There is also the matter of an electrical building where the electrical interests could be properly housed and have one common meeting ground. This recommendation is worthy of thoughtful consideration at the hands of the League. There is also the question of spreading propaganda, acquainting the electrical fraternity at large with the fact that there is such a thing as the San Francisco Electrical Development League; that the League is holding weekly meetings and that all visiting electrical men from out-of-town are welcome to come and participate in our meetings as guests of the League.

Supporting the Cooperative Campaign —

The Electrical Cooperative Campaign should continue to have the hearty support of the electrical industry represented by the League members, to the end that it may carry on the constructive work which it has in hand. It is interesting to note that the Campaign has attracted the favorable attention of the National Electric Light Association and that President Ballard has named a committee to present a report on cooperation between manufacturer, jobber, contractor-dealer and central station at the next convention of the association to be held in Los Angeles next year.

I cannot close without calling attention to the fact that we have in our city what I consider one of the most up-to-the-minute electrical publications in the country in the Journal of Electricity, which I know is at all times eager for news affecting our industry, and I am sure that its columns are open for the use of the League in any matters which it may desire to put forward for the good of the cause.

In closing I will say that the officers-elect have work mapped out for them, and I hope that the day is not far distant when the San Francisco Electrical Development League will awaken and become the potent factor that it should be in our civic affairs. The by-laws have provided the machinery; let us get together and put it into operation.

The Case for Advertising

BY G. DOUGLAS MANTLE

(In spite of the large part which advertising plays in modern business it is a fact that numbers of companies, especially among the public utilities, have no settled advertising policy. The following discussion of advertising formed part of a paper read before a convention of the Pacific Coast Gas Association at Los Angeles. The author, who is an advertising specialist, is with the D. H. McCorkle Company of Oakland, California.—The Editor.)

It is estimated that $750,000,000 is expended annually on advertising in the United States, and of this sum by far the greater portion is spent by companies in the highest standing, whose appropriation increases year by year, and who will frankly admit that without this stimulus to their business they could scarcely exist.

The American Bankers' Association, comprising the principal banks of America, were asked by Printer's Ink in 1914 if they would take into consideration in granting credit the good-will created by advertising. A majority of those who replied stated that due consideration for this good-will should be given in extending credit, and one bank, which is generally regarded as conservative, went so far as to say that "a certain proportion of the advertising expenditure should be shown on the books as investment, the portion to be determined by a comparison of the results which had been obtained, with the reasonable expectation of results to come in the future."

In 1919, but five years later, practically all of the banks addressed are themselves using advertising space freely.

With this example of the development of advertising in this necessarily most conservative profession, it becomes almost a platitude to say that advertising is an absolute necessity to modern business.

Essentials of Good Advertising —

Advertising is not a matter of filling a certain amount of contracted-for newspaper space with words. It is as much a science as any branch of engineering, with definite rules for the application of definite psychological forces.

The successful advertising campaign must be planned far ahead, allowance must be made for every influencing factor, favorable or unfavorable, and through all the idea must remain uppermost that the campaign has but one object—to sell.

Close cooperation with the sales department is essential, and to ensure success the sales and advertising departments should work together as one unit, for it is just as possible for one department to completely nullify the work of the other by lack of harmony, as it is possible for both to more than double their efficiency by careful coordination of effort.

Advertising and personal salesmanship do not conflict in any way. On the contrary skilful advertising must be of great assistance to the salesman.

It may be said that there are four distinct phases in the accomplishment of any sale: (1) Obtaining the prospective customer's attention; (2) Creating the desire for the article that is for sale; (3) Making it clear that the article is easy to purchase; (4) Obtaining the signature to the order.

No one who has had experience can seriously dispute that the salesman is necessary in completing phases (3) and (4), that is in answering inquiries created by the advertising and in closing sales. It has however been proven beyond the shadow of a doubt that phases (1) and (2), the attraction of the attention of the consumer and the creation of the desire to buy, are more efficiently accomplished by intelligent and consistent advertising than by direct sales effort.

The salesman may make his twenty or thirty calls a day, but it is only by the rarest of luck that he calls upon the consumer at the psychological moment.

The newspaper, on the other hand, carries the message into the great majority of homes every day, and by intelligent presentation and constant reiteration drives the point home slowly but surely.

The old time "solicitor" seems to be rapidly becoming extinct, but advertising makes possible the employment of a different type of salesman at higher remuneration because of the increased efficiency of his efforts.

The Tests of an Advertisement —

A good advertisement must satisfactorily answer five questions: (1) Will it attract the attention of the consumer? (2) Is it specific? (3) Is it forcible? (4) Is it sincere? (5) Is it plausible?

No piece of copy should be allowed to go to press which does not satisfactorily answer these five questions. Every word that is extraneous to them should be eliminated.

In writing copy it should be borne in mind that the reader of a newspaper does not primarily desire to read the advertisements and it is almost against his will that his attention must be attracted and held until the story is told. In preparing copy, therefore, the writer must put himself in the place of the prospective consumer and only present such matter as will be of definite interest and at the same time create the desire to possess.

Study of a skilfully composed advertisement will show that when the attention has once been attracted to the first line it is difficult to stop reading until the whole story has been absorbed. The subject is smoothly and logically developed from the first interest creating sentence to the final urging to immediate action.

An advertisement consisting of bald, disjointed statements, or containing matter extraneous to the five essentials is not efficient. The attention of the reader will wander from the subject at the slightest excuse and cannot then be regained.

If the appliance advertised has many points of appeal, the main portion of each of a series of advertisements should be devoted to one of these points,

with but the briefest summary of the rest. An advertisement containing too many points of appeal becomes confusing and has no retention value.

Advertising Must Be Consistent —

The habits of consumers are not changed in a day, and just as it is the constant drop of water that wears away the stone, it is the consistent advertiser who produces results.

Advertising, with the sole purpose of attracting the attention of consumers and creating their desire for the appliance to be featured, should be run long before the commencement of any special sales campaign. When the campaign actually starts large spaces should be devoted to purely merchandising copy, that is, to convincing consumers that the appliance is easy to buy and to securing their immediate orders. To start advertising and campaign at the same time is greatly to reduce the efficiency of both efforts.

In this connection it is suggested to the smaller companies that they should use advertising space consistently throughout the year, and reap the harvest of their advertising by means of periodical sales campaigns. By arranging these campaigns to follow one another in a number of adjacent towns, these companies might profitably follow the example of the California electrical fraternity in hiring one good salesman to work for several companies.

The Advertising Appropriation —

Two factors decide the amount of money which can be spent on advertising by any company. First, the volume of new business it is possible to obtain; second, the amount that can profitably be spent to secure that new business. If it can be shown that a definite volume of new business can be obtained for the expenditure of a portion of the receipts which still leaves a good margin of profit the question of the advertising appropriation becomes a simple business proposition and should be decided as such.

It is true that the most experienced man cannot say that the investment of a certain sum in advertising will produce a certain definite volume of new business, and for this reason advertising is still regarded by many of the older school of business men as more or less of a gamble. The skilled advertising man has, however, learned from the most excellent of all teachers, experience, that a certain sum invested in carefully planned publicity must result in returns which approximately average.

The general practice in allotting appropriations to the sales and advertising departments appears to be to increase the previous year's appropriation a little if times are good, and to reduce it considerably if times are bad. Consequently it is almost impossible for either department to plan its work ahead intelligently and the results obtained are far poorer than they otherwise would be. For this condition of affairs I believe that we, the sales and advertising men, are totally to blame. It is not to be believed that an expenditure of thousands of dollars upon some engineering improvement is made at the direct instigation of the executives of any company. On the contrary, the engineering department, before asking for any appropriation, is careful to prepare an elaborate report proving that the advantages of the improvement in question will more than outweigh its cost, and it is only on the conclusive showing of this report that the expenditure will be approved.

The new business departments do not, on the other hand, prepare a statement of anticipated results which would justify an annual appropriation commensurate with the work, which in the interests of the company alone, they should be expected to do.

If those responsible for the new business departments would carefully survey their territories and decide upon the volume of new business they could reasonably expect to produce during the coming year, and could undertake to secure this new business at a cost which would be profitable to the company, they would be in a position at least as favorable as that of the engineering or other departments in asking for appropriations.

It may be objected that whereas engineering improvements are a capital charge, advertising must be charged against expense. The opinion of the American Bankers' Association should cover this objection, and while it is not claimed that it would be good bookkeeping to charge advertising to anything but expense, the good-will created by advertising is as valuable an asset to any company as any of the material that appears on the inventory.

When the new business departments undertake to secure a definite volume of new business during the year the company has automatically adopted a policy of expansion which must not only increase its good-will value, but at the same time have a vitalizing influence on every officer and employe. Further, the sales and advertising departments are for the first time placed on a definite efficiency basis.

Some time ago the writer had occasion to make sales analyses of the properties of a large holding company, the investigation covering a number of large and small subsidiary companies operating under a great variety of conditions. In every case it could be shown that the saving effected by a reasonable increase in output more than offset the cost of securing the new business. Peculiarly enough, the worse the apparent financial condition of the company, the more was new business effort necessary. In fact, we were able to show that two companies, the condition of which was regarded as desperate by the holding company, could be put on a solid financial basis by a little consistent and efficient new business effort.

The issue of December 15th will be a special issue featuring publicity from every standpoint in relation to the electrical industry. There will be new plans for conveying the electrical message to the public as well as methods which others have found successful. Find out what the others are doing.

Better Lighting

(That output is definitely increased by improved lighting was one of the interesting points brought out at the recent lighting exhibit described below. The advertising value of good store illumination and the pleasing effects of correct home lighting were also illustrated with marked success, and it is expected that much good will result from this move in the 'better lighting' campaign.—The Editor.)

Public interest in better lighting in the home, shop, factory and show window was greatly stimulated by the recent Mazda Lamp and Lighting Exhibit of the Edison and National Lamp Works of the General Electric Company at the California Industries and Land Show, held in San Francisco. The

As a selling factor the well-lighted store window has double the value of one which is poorly lighted. Correct and effective illumination should be an integral part of the display.

exhibit was educational in character, its primary object being to show by actual demonstration how better lighting can be obtained with Mazda lamps properly equipped with modern reflectors and electrical furnishings.

Home Lighting —

A model living room 16 by 24 ft. in size, completely furnished and lighted with suitable side brackets, a Duplexalite ceiling fixture and floor and table lamps, offered suggestions for home lighting. Each of the three different kinds of fixtures was controlled by a separate wall switch which made it possible to demonstrate the effect produced by side brackets, the ceiling fixture or floor and table lamps separately, or any combination of the three. An experienced attendant operated the switches while explaining the object of the display, calling attention to the advantages of the three kinds of fixtures and the ease with which glare could be eliminated from the home by the proper selection and arrangement of the electrical furnishings. If the expressions of delight and the questions asked by the ladies may be

The elimination of glare and harsh effects is provided for in a most satisfying way by up-to-date home lighting devices. Note the absence of heavy shadows and unpleasant lights in this restful room arranged for the lighting exhibit.

taken as a criterion, there can be little doubt but what this part of the exhibit was well received and will be the cause of a higher standard of illumination in many homes.

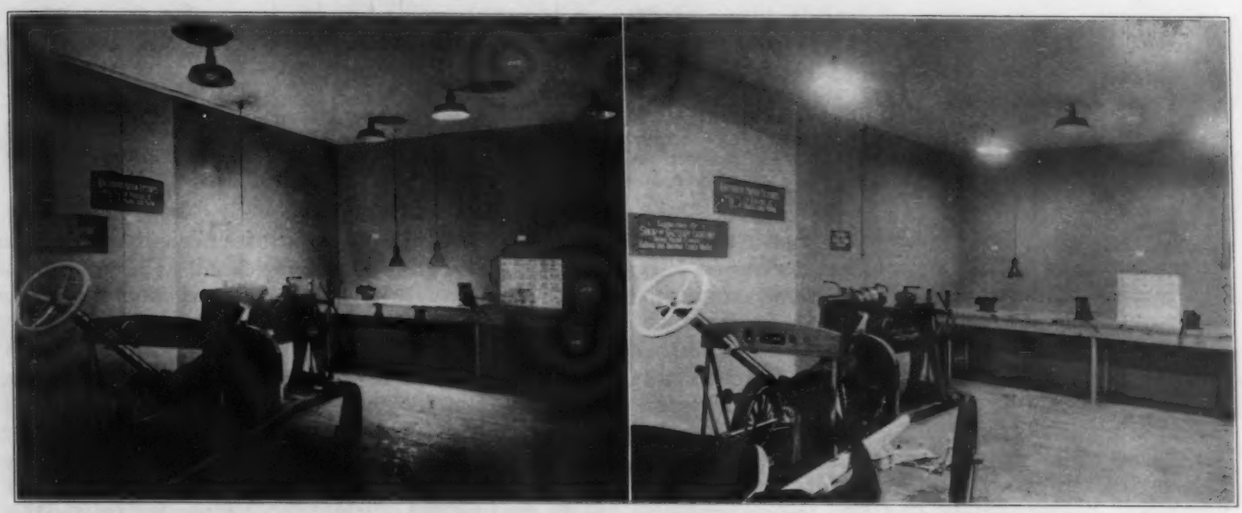
The Display Window —

For the benefit of the merchant, a modern display window, 16 feet long by 6 feet deep, lighted with

TESTS TO DETERMINE EFFECT OF GOOD LIGHTING ON PRODUCTION

	Test No. 1 Ironing Pulley Finishing Shop	Test No. 2 Soft Metal Bearing Machine Shop	Test No. 3 Machine Shop Handling Heavy Steel Parts	Test No. 4 Carburetor Assembling Shop
Floor Area in Sq. Ft.	3200	2400	2320	4000
Old Equipment	60 watt drop cords bare and with tin shades	100 w. Mazda with deep bowl reflectors	100 watt Mazda "C" modern reflectors	40 w. & 100 w Mazda bare tin shades and in clusters
	0.27 w. per sq. ft. 0.2 ft. cdls.	1.0 w. per sq. ft. 4.6 ft. cdls.	0.6 w. per sq. ft. 3.0 ft. cdls.	1 w. per sq. ft. 2.1 ft. cdls.
New Equipment	200 w. Mazda with modern reflectors 1.9 w./sq. ft. 4.8 ft. cdls.	200 w. Mazda with modern reflectors 2 w./sq. ft. 12.7 ft. cdls.	300 w. Mazda with modern reflectors 1.7 w./sq. ft. 11.7 ft. cdls.	200 & 300 w. Mazda with modern reflectors 1.9 w./sq. ft. 12.5 ft. cdls.
Increase in gross cost of New over Old Lighting	$105.00 per month 5.5% of pay roll		$29.00 per month 1.2% of pay roll	$57.90 per month 0.9% of pay roll
Average Increase in Production	Test records 20% All records 35%	15%	10%	12%

The tests here shown were made in Chicago by the Commonwealth Edison Company, and were based on a fair proportion of work done during dark hours or where work was little affected by daylight. Both hand and machine work were included.



The picture on the left illustrates the incorrect way to light a workshop—with ordinary ceiling lights, and unshaded lamps on drop cords. It will be noticed that the light is very unevenly distributed, and exceedinglytrying to the eyes. On the right is the correct illumination, with a steady, evenly-distributed light, obtained by means of reflectors, and no darkcorners. Actual figures have been compiled to show that good lighting has a very marked effect upon production.

modern show window lighting equipment, was arranged with a display of highly colored ladies' wearing apparel. Three switches, conveniently placed, controlled the lights so that the following could be demonstrated:

(1) Intensities of daylight quality of light from the Mazda Daylight lamp suitable for the down town store.
(2) Intensities of light from the Standard Mazda C lamp suitable for the down town store.
(3) Intensities of light from the Standard Mazda C lamp suitable for the small town or outlying sections of the large towns.
(4) The effect of mixing the light from the Mazda Daylight and the Standard Mazda C lamps.

An attendant in charge explained to the interested merchant the advantages of modern display window lighting with the proper lamp and reflector equipment properly placed and concealed, the advantage of suitable color and texture of the window background, as well as the advantages of the multiple switch control which allows the window trimmer to obtain the lighting effect desired for any particular trim by varying the quality and quantity of light.

Lighting and Production —

Good and bad shop and factory lighting were demonstrated in a model repair shop lighted correctly and incorrectly. The incorrect method consisted of ceiling lights for general illumination and drop cords, some with bare lamps and some with reflectors for local illumination. The correct method consisted of 6 Mazda C lamps equipped with Ivanhoe RLM reflectors and Genco diffusing caps, producing a high intensity of evenly distributed illumination without glare or objectionable shadows. Each system was on a separate switch which was in charge of an experienced industrial lighting expert, who explained to the visitors the good and bad features of the two installations.

By means of a chart showing the results of a lighting survey in a large number of industrials, to determine the actual effect of good lighting upon production, the attendant pointed out to the plant manager in definite terms the value of good lighting from the standpoint of increased production. Because of the comparatively high wages paid skilled workmen at the present time and the desire of shop managers to increase production to the greatest possible extent, this part of the exhibit seemed to create the greatest interest.

ENGINEERS OF YESTERDAY
(Series Compiled by A. L. Jordan)

17. The Montgolfiers Brothers

Who were the first balloonists?

The brothers, Joseph and Jacques, were sons of a paper-maker at Annonay, France. While observing the clouds they reasoned that some other "vapor" might be supported as well. Small paper bags filled with smoke were sent up in 1782 and a large linen balloon in 1783 (repeated soon afterward at Versailles in the presence of the court—see picture).

In this same year a hydrogen balloon, under the supervision of the physicist Charles, was sent up, and in this year also a man named de Rosier made the first ascension, using a hot-air balloon.

One of the brothers (Joseph) invented the hydraulic ram in 1796.

Electrically Operated Wasteways of the Tieton Canal

BY C. F. GLEASON

(Irrigation, which is playing so prominent a part in the development of the West, is constantly bringing to the front interesting new applications of electricity. Among the most important features of the Tieton Irrigation Project are the electrical devices described below, used in the operation of the canal. The author is engineer with the U. S. Reclamation Service at Yakima, Washington.—The Editor.)

The main canal of the Tieton Irrigation Project, completed by the U. S. Reclamation Service in 1911, is provided with a system of electrically controlled wasteways calculated to minimize damage to the canal and delays in the delivery of water due to rock slides or other accidents. The intake of this canal is located about 30 miles west of Yakima, Washington, and diverts water from the Tieton river. From the intake the canal runs along the side slopes of the deep precipitous canyon of the Tieton river for a distance of approximately 12 miles, the water being

View of the Tieton Canal near Spillway No. 5. The length of the canal is approximately 12 miles and its capacity 330 cubic feet per second.

carried in a succession of tunnels and concrete flume sections. The capacity of the canal is 330 cubic feet per second. Of the total length of 12 miles, 2.1 miles consist of tunnels, the remainder being a semi-circular concrete flume 8 ft. in diameter resting on a bench excavated along the hillside. The character of the country is difficult for a canal location. Steep slopes covered with loose rocks and boulders and broken by numerous cliffs, extend in some places for 1,000 feet above the canal and the flume is therefore exposed to the danger of rocks rolling down and demolishing it or falling into it and causing the water to overflow the sides.

The amount of damage done by a rock would in itself in most cases be slight and easily repaired, but the escaping water, if allowed to flow for any length of time, might do great damage by washing away the hillside and undermining the foundations of the flume. For this reason a scheme, whereby the flow of water would be quickly and automatically stopped following such an accident, was considered to be highly desirable.

Wasteways

For this purpose there was installed a system of electrically operated wasteways. The wasteways are five in number and are located at approximately 2-mile intervals, each being of sufficient capacity to discharge the total flow of the canal. The wasteways are equipped with a 4 by 5 ft. cast iron slide gate located in a concrete structure alongside the flume. Power for operating the gate is furnished by a 6-hp. hydraulic turbine of the vertical wicket gate type, mounted in an iron case located above the gate. The intake of the turbine is in the curtain wall above the sluice gate in such a position that, when the sluice gate is fully open, the turbine intake opening is covered by it and the supply of water to the turbine shut off. This arrangement serves to automatically stop the turbine when the gate is fully opened. Distant electrical control of the opening of the gate is provided by a magnetic trip mechanism operating to release a small counter weight attached to the turbine gate control shaft. Release of the counter weight serves to open the wicket gates of the turbine and admit water for its operation. A reverse gear set is provided between turbine and gate so that the gate may be closed as well as opened by means of the turbine. The presence of an attendant is necessary for closing the gate and resetting the magnetic release.

Float Switches

Electric float switches or "alarms" are provided for the purpose of closing an electrical circuit whenever an abnormal change in the elevation of the

Interior of the flume showing damage caused by a boulder rolling down the hillside. Float switches are installed along the flume which act as alarms when an obstruction raises the water level.

water surface takes place at any point in the flume. The velocity of flow in the flume is approximately 9 feet per second and the freeboard 9 inches. On account of this high velocity of flow the effect of an obstruction in the flume does not affect the water surface for any great distance upstream. For example: an increase in water depth at any point of 9 inches above normal, which would be sufficient to overflow the flume, will cause an increase of only

about 4 inches in the depth at a point 250 feet upstream and an increase of less than 1 inch at a point 500 feet upstream. It was therefore necessary to place float switches at intervals of about 250 feet in order to insure the operation of one of them in case of an obstruction of the flow at any point that would cause the flume to overflow. Float switches, designed to close upon an increase of the water surface elevation above the normal stage, were therefore installed at 250-foot intervals along the flume. In addition to these so-called "high water alarms" there were provided at intervals of about ¼ mile, combination high and low water alarms. The alarm device consists of a galvanized iron tank 6 inches in diameter attached to the side of the flume and connected with it at the bottom by a ⅜ pipe so that the water stands at the same elevation in the tank that it does in the flume. The tank contains a copper ball attached to a float rod having an electrical contact mechanism at the top. The high water alarms have one ball float and the high and low water alarms have two ball floats seperately adjustable for the high and low water elevations at which it is desired to have the alarm operate. The contact mechanism is protected by a cast iron cap and the whole apparatus enclosed in such a manner that it cannot easily be tampered with.

A pole line built alongside the canal carries the necessary line wires for the signal circuits and a telephone circuit. The signal line consists of two number 12 and one number 8 galvanized iron telephone wires carried on telephone insulators. Leads to alarms, wasteways, etc., are of insulated copper wire.

Electrical Equipment

A switchboard is provided at each wasteway and at each of the two patrolmen's houses for the mounting of instruments and switches. Patrol house No. 1 is located at the canal intake and patrol house No. 2 is located about halfway down the canal. Energy for operating the system is supplied by dry batteries. The main signal circuit is operated at a potential of 30 volts supplied from a battery at patrol house No. 1. Signal bells and gate release magnets are operated on secondary circuits by means of relays in the main circuit. An "open circuit" system is used.

The primary functions of the system are as follows. First: when an alarm switch is closed the wasteway adjacent to the point of alarm in an upstream direction is caused to open by the energizing of its magnet release. Second, an alarm bell rings at each of the two patrol houses and a wasteway indicator shows which wasteway has opened. Third: the signal circuits are interlocked in such a manner that no additional wasteways will open until the one already open has been closed again and normal conditions of flow in the canal have been restored. This provision is necessary because, whenever one wasteway is opened, the flow of water in that part of the canal downstream from it of course ceases as soon as sufficient time has elapsed for the water then in the canal to run out. As low water alarms are located at ¼-mile intervals over the entire distance, the contacts of these alarms are closed consecutively as the water drops and the wasteways controlled by them would in turn be opened if no provision was made to interrupt the connecting electrical circuits. The alarms are connected in divisions, the division points being the 5 wasteways. Each division of alarms is connected to the adjacent wasteway upstream and serves to operate that wasteway only.

The instruments used are of stock construction. The relays are the ordinary telegraph type with 200-ohm magnet coils. The spillway indicators were improvised from voltmeters having 0-15 volt scales. Scales marked with the numbers of the wasteways were substituted for the original scales on the instruments. The indicators are connected across the terminals of the 200-ohm coils of the relays, the coils serving as a shunt resistance. Their principle of operation is based upon the fact that a different voltage is impressed upon the relay magnet for each wasteway that operates because of the different line resistance that is included in the circuit. Resistance coils at the various wasteways are also included in the circuit for the purpose of further increasing the external difference of potential and so adjusting the total resistance of the circuit that the several positions of the indicator pointer for the different wasteways will space up equally on the indicator scale.

A telephone type lightning arrestor is provided at each wasteway and patrol house.

A so-called "gate switch" is a part of the gate operating mechanism at each wasteway. This switch is a single pole double throw switch mechanically connected to the gate in such a manner that it is thrown from one contact to the other when the gate opens. Its operation serves to interlock the circuit to prevent the opening of other spillways as previously noted and also to bring into operation the patrolman's alarm bells and spillway indicators.

In addition to the instruments required for the regular operation of the system, there are also provided voltmeters and push buttons for testing the system for broken wires or connections and for grounds.

The system was placed in operation in 1911 and was used continuously for several years thereafter. During the last three years an enlargement of the canal has been made. The work of enlargement necessitated removal of the float switches and after its completion only a part of them were replaced because after the canal had been in use for a few years excavated slopes become more stable and danger from earth slides and rolling rocks practically ceased.

Among items of particular interest in the December 1st issue of the Journal of Electricity will be the use of the method electrical in the lumber industry, together with a number of technical features of special importance to engineers.

The New Physics

BY A. C. CREHORE

(The elimination of several hitherto unknown quantities in electrical formulæ provides a foundation for the understanding of certain aspects of electricity which have hitherto been untouched. Dr. A. C. Crehore, the author of this important series of articles which begins with this issue, has a world-wide reputation as a creative scientist in the electrical field.—The Editor.)

In the early study of electricity and magnetism, observations of a great variety of phenomena were made, but at that time they seemed to have no evident connection with one another. When a stick of ebonite is rubbed with flannel the stick becomes electrified and is capable of attracting bits of paper presented to it. When a steel magnet is brought near iron filings they are attracted by the steel, but the pits of paper are not affected by the steel. Neither are the iron filings affected by the electrified rod of ebonite, while the paper is. It cannot be said that electrical science began until some method was discovered by which these varied phenomena could be measured. To do this meant that some kind of law governing the phenomena must first be discovered. We owe to Coulomb (1784) our earliest knowledge of the quantitative laws of electric attraction and repulsion. The result established by the investigations of Coulomb may be thus stated. If two spherical bodies are given fixed charges of electricity there results an attraction between them when the charges have a different sign, and a repulsion when they have the same sign. Denoting this repulsion by unity, when the distance between the centers of the two spheres is x, say, he proved that the repulsion is 1/4th when the distance is increased to 2x, 1/9th when increased to 3x, etc., without changing the amount of either electrical charge.

Variations in Mutual Force

And, again, by using metallic spheres, so that the electricity could flow from place to place without obstruction, he found that he could divide the charge that one of the spheres contained into two equal parts simply by bringing into contact with the charged sphere an uncharged sphere of the same radius. The electrical charge of the one then flows over them both, and from the geometrical symmetry it can be seen that when they are separated again each sphere will be equally charged, and each must then contain one-half of the original charge of the first sphere. Dividing the charge in this manner it was observed that the force of repulsion was also divided by two each time without changing at all the distance between the centers of the two spheres. The same thing also applies to the other sphere. When the charge on each was divided by two the force was observed to become one-quarter of its original value. These results may be stated in words as follows: The force which is mutually exerted between two electrified spheres at some distance apart as compared with their radii is directly proportional to the product of their electrifications and inversely proportional to the square of the distance between their centers. When one quantity is proportional to another, it is equal to the other quantity multiplied by some constant. The law thus established becomes

$$F = C\frac{e_1 e_2}{r^2},$$

where C denotes some constant, e_1 and e_2 the values of the two charges, and r the distance between the centers of the two spheres. But this is not the whole of the law, for it was also found that the force exerted by one charge on the other might be changed in another way without changing either the distance between the centers of the spheres or the amount of charge on either one of them. This could be done simply by inserting between the two spheres a piece of uncharged glass, hard rubber or other material. The effect of this was to reduce the value of the force of repulsion as compared with the force when simply air was present between them. The amount of the reduction of the force depended entirely upon the kind of material inserted between the spheres, and one could tell after a little experience what kind of material it was that was introduced without seeing the material at all, but by observing the change in the value of the force. As a result of this observation a certain number had to be multiplied into the denominator of the equation above given according to the character of the substance in which the two spheres were placed while conducting the experiment, and this number has been called the specific inductive capacity of the medium because it depends upon the kind of medium only and upon nothing else. It is denoted by the letter k, and the complete law that Coulomb found may be expressed:

$$F = C\frac{e_1 e_2}{k\, r^2},$$

It is found that k has its minimum value in vacuo. It is just a trifle larger for air but is several times larger for glass and gutta percha.

Electrostatic System of Units

Some such law as this had to be discovered before there was any way by which quantities of electricity could be measured. Assuming that the above is a true relation between the quantities concerned, it is to be observed that there are four kinds of quantities in it,—force, distance, specific inductive capacity, and electrical charge. Only two of these had ever been measured before, force and distance in terms of the centimeter, gram, and the second as units of length, mass and of time. The other two, specific inductive capacity and electrical charge, we seek to obtain from this single equation. But in the nature of things two independent equations are required to obtain the independent values of two unknown quantities. There never has been, however, any other equation than this, and men have been compelled to build up a system of units based upon this one equation, and known as the electrostatic system of units, by a sort of subterfuge as it were,

in which it has been assumed that the specific inductive capacity, k, is numerically equal to unity for a vacuum, and that we are unable to express the unit of specific inductive capacity in terms of length, mass, and time, as force is expressed. This necessarily means that we are also unable to express the other unknown quantity, electrical charge in terms of length, mass and time as force is expressed, because the arbitrary assumption in regard to k must always be reckoned with as unknown.

Units of Force and Electrical Charge

If, now, it is desired to define the unit of electrical charge by means of the above relation, it may be agreed that there is one unit of electrical charge on each sphere when the distance between the centers of the two spheres, r, is one centimeter, and when the force of repulsion between them is one dyne, the two charges being equal to each other. If the specific inductive capacity, k, is also considered to be unity, this makes all of the quantities in the equation numerically equal to unity except the numeric C. Hence, C must be unity in order that it shall be a true equation. With this definition of the unit, therefore, the constant C may be suppressed, giving simply

$$F = \frac{e_1 e_2}{k\ r^2}$$

If e_1 and e_2 are equal to each other, this may be written

$$e^2 = k\ F\ r^2$$

The unit of force, the dyne, is defined as that force which will produce when continuously applied to one gram of matter a uniform acceleration of it equal to one centimeter per second per second. This definition comes from the known law connecting force with mass and acceleration, namely

$$F = m\ a,$$

where m is the mass in grams, and a the acceleration in centimeters per second per second. By making both m and a unity in this, F becomes a unit of force. The reason for saying per second per second in referring to acceleration is that the time comes in twice, since acceleration is the rate of change of a velocity. The time comes in once in saying the rate of change, and again in saying velocity because velocity is equal to a distance divided by time. Now, a velocity may be formally expressed by the symbols L/T or $L\ T^{-1}$, where L may denote any length, and T any time. And, an acceleration requires that the velocity be divided again by a time, and so may formally be expressed by the symbols L/T^2 or $L\ T^{-2}$, L denoting any length and T any time as before. According to the last equation above force will be obtained by multiplying this acceleration by a mass, and it may formally be expressed by the symbols

$$F = L\ M\ T^{-2}.$$

No matter what the values of these lengths, masses or times are, as denoted by these symbols, it will always be found that the quantity obtained by multiplying them together in this particular combination will possess all of the qualities of a force.

In a similar fashion every one of the units employed in mechanics, mass, momentum, moment of momentum, force, energy, etc., are capable of being expressed in the symbols L, M and T, and every different kind of unit combines these three symbols in a different way, so that, if we knew what the combination of symbols is, we would also know the nature of the quantity expressed by them. The combinations of symbols above described are ordinarily called the dimensions of the unit or of the quantity, and they are very useful because the combination is fixed for each different kind of unit. When any uncertainty arises as to the kind of quantity which results from a combination of several different kinds of quantities measured by different kinds of units, the matter may easily be decided by writing out the dimensional formula, a procedure which often prevents error.

Let us now return to the expression for the square of electrical charge as given above. The dimensional formula for it is evidently that of a force multiplied by the square of a length and by the unknown quantity, k, giving as a result

$$e^2 = L^3\ M\ T^{-2}\ k$$

And, taking the square root, the dimensions of e become

$$e = L^{3/2}\ M^{1/2}\ T^{-1}\ k^{1/2}$$

These are the dimensions of quantity of electricity which will be found in all of the current tables of dimensions of electrical units in the so-called electrostatic system of units. The presence of the unknown quantity k is required in every one of these units, and it is required because the true nature of k has never been revealed in terms of L, M and T by any other fundamental equation like that established by Coulomb. It may be stated in advance of the proper place that the author has found another fundamental equation, which, combined with this equation of Coulomb, makes it possible to obtain both unknown quantities, e and k, in terms of L, M and T, which thus reveals the true dimensions of e and of k. The result obtained for k is to make it the reciprocal of a velocity, namely $L^{-1}\ T = T/L$. But this is in advance of the narrative.

Measuring Magnetism

At the same time that this law of action between two charges of electricity was found Coulomb also established a similar law of action between two magnetic poles. This may be briefly stated as follows. The force exerted between two magnetic poles at the same distance is directly proportional to the product of the strengths of the poles. And also, the force exerted between two magnetic poles of the same strength but at different distances, is inversely protional to the squares of the distances. These statements are both included in the formula

$$F = C\ \frac{m_1 m_2}{r^2}$$

where C is some constant, a numeric, and m_1 and m_2 represent the strengths of the poles, and r the distance between them.

Here again it was found that it was not sufficient to define quantity of magnetism by means of this equation alone, because without changing the distance between the poles or the strengths of them the force exerted by the one upon the other might be altered simply by changing the medium in which the poles were immersed. So an unknown quantity, μ, had to be introduced into the formula. In vacuo the force is a maximum and very nearly the same as in air. So the multiplier, μ, is placed in the equation as was the k in the electrostatic equation, giving

$$F = C\frac{m_1 m_2}{\mu r^2}$$

There are, as before, four different kinds of quantities concerned in this equation, force, distance, quantity of magnetism, and magnetic permeability, and only two of these have ever been measured or defined before, force and distance. The other two, magnetic permeability and quantity of magnetism, we seek to define by means of this equation. It has in a similar manner been customary to call the magnetic permeability of a vacuum unity and define the unit of quantity of magnetism by taking the distance, r, between the poles unity, and the force unity, whence the constant C must also be unity in order that this may be a true equation, giving

$$F = \frac{m_1 m_2}{\mu r^2}$$

If m_1 and m_2 are equal to each other, this may be written

$$m^2 = F r^2 \mu$$

The dimensions of quantity of magnetism are then found from this, as shown, giving

$$m^2 = L^3 M T^{-2} \mu$$

Except for the change from k to μ these dimensions are precisely the same as those of quantity of electricity on the electrostatic system above given. But, since the dimensions of k and of μ were unknown, there was no means of knowing whether quantity of magnetism and quantity of electricity are the same kinds of quantities or not. In other words the dimensional formulae for electrical and magnetic quantities are robbed of their power of identifying the precise kind of quantity being dealt with until both k and μ are known. We had become so accustomed to relying upon the dimensions of mechanical quantities to determine the kind of quantity without question that it was disconcerting to be compelled to give up this useful tool, and to build up two parallel systems of units, one electrostatic and one electromagnetic unit for every kind of electrical and magnetic quantity. It may be stated in advance of the proper place again that the author has found the dimensions of μ as well as those of k above mentioned, for one of them is automatically determined as soon as the other becomes known, as we shall presently see. The result is that k and μ each have the same dimensions in terms of length and time, namely the reciprocal of a velocity. According to this, quantity of electrical charge and quantity of magnetism are precisely the same in dimensions, and represent precisely the same kinds of quantities. But this is again in advance of the narrative.

The fundamental conceptions and laws that have led to the establishment of two very different systems of units, the so-called electrostatic system, and the electromagnetic system, with which every student of electricity and magnetism is familiar, because they are now in everyday use, have been outlined above.

Technical Hints

BY LOUIS ETSHOKIN

(The reason why certain types of motors are good for variable loads, whereas others are best adapted to constant current demands is here made clear. This is the second of a series of articles on the theory back of practical problems as they are encountered in the field. The author is electrical engineer with the Halcun Radio Company.—The Editor.)

GOVERNING OF ELECTRICAL MACHINERY

One of the numerous advantages of electrical machinery is the fact that it is self-governing. On a gas engine or a steam engine or an air motor, or a hydraulic motor, an essential and often a very expensive part of the machine is a governor. On these machines, when the load goes off, the supply of power continues until checked by the governing apparatus, and if something happens to the governing apparatus, the machine will run at bursting speed.

On the other hand, an electric motor, or a transformer will adjust the amount of current it consumes

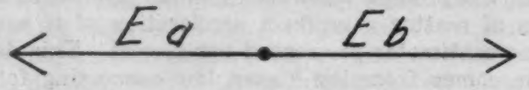


Fig. 1

The more work a synchronous motor is called upon to do, the more current it will draw, since the back voltage generated by the motor is equal and opposite to the applied voltage, and no I R drop is available.

to the amount of load it is carrying. The exception to this rule is the series motor. If we attempt to use the series motor for constant speed work, we will find that the governing mechanism does not work that way.

If we use the series motor where we want constant power, however, we have an ideal driving unit. A series motor does automatically what you do for the gas engine in an automobile when you shift gears. You come to a hill with your automobile. Immediately you shift gears so that your gas engine can make more turns for each turn of your wheels. The net result is, that your wheels go slower.

But a series motor would do this automatically. Try to make a series motor do more work and it will do it, but less rapidly. Get it to do less work, and it will do it more rapidly. Therefore it is an ideal motor for traction and hoisting work.

A shunt d.c. motor, on the other hand, will keep its speed practically constant whether the load be

light or large. The more load it is given the more current it will pull. How is this brought about?

It all depends on this law. The total voltage impressed on a d.c. motor goes to make up the I R drop in the motor, and to counteract the counter voltage produced by the motor.

So, if our load gets a little larger, the first impulse of the motor is to slow up. Immediately, the counter voltage produced by the motor decreases, and

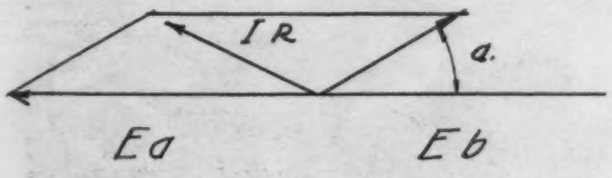


Fig. 2.

The bigger the load the greater the angle a, and the greater the resultant I R, and the greater the current.

we have more voltage available for I R drop in the motor. This causes more current to flow, causes more torque to be developed, and a balance is again set up between the counter voltage and the necessary current. So much for d.c. motors.

How about a.c. motors? A synchronous motor either runs at a certain speed or does not run at all. Up to a load at which it will not work, it will run at a constant speed. The more work it is called upon to do, the more current it will draw; the less work the less current. The reason is as follows:

With no load, the back voltage generated by the motor is equal and opposite to the applied voltage, and no I R drop is available (Fig. 1). But as load goes on, this back voltage, although remaining equal to the applied voltage, does not remain opposite to it, and consequently there is a resultant voltage which makes an I R drop available, and supplies current. The bigger the load the greater the angle a (Fig. 2), and the greater the resultant I R, and consequently the greater the current.

In an induction motor the speed varies slightly, due to what is known as slip, between the rotating field and the rotor. The greater the load, the greater the slip and consequently the greater the currents produced in the rotor, and in the stator of the machine.

Electrification of Swiss Railways

BY F. DOSSENBACH

(The electrification of railways is a matter in which the West has taken a very active interest for some time. The similar conditions of extensive water power resources in Switzerland and the development and future plans for electrified railroads in that country are here described by the director of the Official Information Bureau of Switzerland in New York.—The Editor.)

The introduction of electric traction on the lines of the Swiss Federal Railways has in these latter years, on account of the acute shortage of coal occasioned by the war, received the foremost attention of the authorities and has now emerged as a very practical economic question.

Water Power Resources —

The principal nerve of the Swiss railway system is government owned. The electrification of these lines is simplified by the vast store of unused water power which the country possesses. According to an official survey, verified in 1914, including the stowing and improvement of lakes, the water power of Switzerland is capable of producing an energy equal to 2,173,000 horsepower. If old plants were replaced by new ones it is even estimated that the highest efficiency of the total water power reserves could be raised to as much as 8,000,000 horsepower. On January 1, 1914, the electric power already in use in Switzerland amounted to 887,000 horsepower.

First Electric Railways —

The Swiss Confederation owns some 1800 miles of the entire railway system of the country, which covers 3,216 miles. Of the 1,416 miles owned by private companies 622 miles are already electrical, but only an insignificant percentage of the government railroads has so far been operated by electricity.

The first important Federal standard-gauge road to be chosen for electrification was the Gothard Railway, one of the important international highways, featuring moreover in many sections the brilliantly conceived engineering of mountain railways. The electrification of the 68 miles section Erstfeld-Bellinzona was approved in 1913 and it is expected that it will be opened this Fall. This section, with 28 per cent of its length consisting of tunnels and a grade of 2.5 to 2.7 per cent for 25 miles, was chosen for an experiment because of its enormous traffic with Italy, which caused large consumption of coal with resulting smoke in the tunnels.

Plans for Development —

The sections Bellinzona-Chiasso and Erstfeld-Lucerne are expected to follow in 1921 and the consulting experts have found that the big power stations at Amsteg and Ritom, the first yielding 26,000 horsepower and the latter 32,000 horsepower, will also suffice for these lines, even if the traffic should increase some 60-70 per cent. Another series of plants yielding 70,000 horsepower is planned for eastern and central Switzerland.

The cost of electrification of the Erstfeld-Bellinzona line is estimated at $8,000,000. The cost of electrifying the entire Federal railway system is estimated roughly at $200,000,000.

In 1918 the electrification of the following railways using steam traction was decided upon and work on them commenced at once: the sections of the Federal Railroads Sion-Brigue and Berne-Thun; the section Hasle-Langau of the Emmenthal Railroad and the section Bevers-Filisur of the Rhaetian Railroads.

The to-be electrified section Sion-Brigue will be a continuation of the electric traction Simplon tunnel which was opened for traffic in 1906, with its northern exit at Brigue.

Electric Lines Now Operating —

The electrified Berne-Thun line, connecting with the electric Berne-Lotschberg-Simplon railway, which latter was inaugurated in 1913, has already been opened for traffic—in May last. It now provides excellent and frequent train connections between the Swiss capital, the Bernese Oberland resorts and—in connection with the Lotschberg line—the Valais and Northern Italy.

The new locomotives which are being used by the Swiss Federal Railroads on the section Berne-Thun, besides those of the Berne-Lotschberg-Simplon line, are each equipped with four single-phase alternate current motors, each of 450 horsepower. The electric parts were furnished by Brown-Boveri & Company, Baden, and the mechanical parts by the Swiss Locomotive and Machine Company of Winterthur.

The electrification works on the Bevers-Filisur line were completed by the middle of last April, and from April 16 steam engines have been duly replaced by electric motors, the current being supplied by the power station of Bevers, which furnishes the necessary energy for the Engadine lines which were electrified in 1913.

THE RAILWAY AUTOMATIC SUB-STATION

(The service of the automatic substation in power distribution has been found most effective in reducing expenses, as well as very safe in operation. The special automatic features of a recently installed railway sub-station are described here.—The Editor.)

The automatic sub-station recently put into service at the Torrance sub-station of the Pacific Electric Railway Company has proven very successful and some of its automatic features are of exceptional interest.

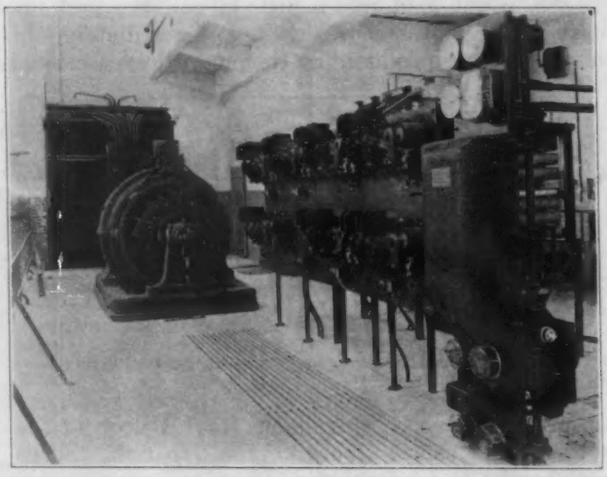
The sub-station operates entirely automatically and eliminates the necessity of any sub-station operators, which means a direct saving in the railway company's operating expenses.

When the trolley voltage drops for two seconds to a predetermined voltage, the station starts up automatically and in from 30 to 40 seconds the rotary is delivering power to the line. When the power demand ceases for a predetermined period (this time can be set at from 3 to 20 minutes) the rotary will shut down automatically. If the incoming a.c. feeder voltage is below a predetermined amount the rotary will not start.

A thermostat is so placed that it will automatically shut down the rotary in case of a sustained overload; however, the station will start again automatically as soon as the thermostat cools down.

The starting switch on the rotary cannot close until all but the pilot brushes are completely raised. The brushes will not lower until the d.c. voltage has built up to full voltage of the right polarity. In case the d.c. voltage comes up wrong polarity, the field is automatically reversed. Should it come up wrong three times in succession, the starting switch automatically opens long enough to allow the rotary to slip a pole, then closes again. This operation will continue until the voltage comes up right.

The d.c. contactors which connect the rotary to the line cannot close until the brushes are all completely down on the commutator.



Automatic sub-station equipment recently put in service at Torrance by the Pacific Electric Railway Company. The equipment, furnished by the Westinghouse Electric & Manufacturing Company, consists of: 1—100-kw. multiple self-starting a.c. converter; 1—10,000-kva., 3-phase, 50-cycle, 16,000-volts oil immersed self-cooled transformer, and 2 switchboards, which take care of all automatic features.

In case of heavy overload, resistance is automatically put into series with the machine. Thermostats automatically shut down the rotary if the overload remains long enough dangerously to heat the resistance. When the resistance cools, the station is ready again to start automatically. An air operated automatic circuit breaker protects the station on the high tension side of the transformer.

A thermostat is placed in each bearing to protect against overheating. An overspeed device is placed in the armature shaft.

The main d.c. contactor has a relay which opens when the contactor has made three successive attempts to close on a short circuit or a grounded line.

In case any one of the above relays opens, the station will, by opening the automatic control circuit, shut down and lock itself out until an inspector visits the station, clears up the trouble, and resets by hand the relay which has tripped.

REVIVING PLANTS WITH ELECTRICITY

Reviving plants with electricity has been the subject of several recent experiments. One of these was tried on a small cactus plant which had been sent from Mexico, and which seemed to pine away rapidly. The cactus appeared to be nearly dead when the experiment was first tried. Two cells of a dry battery were used, the positive pole being connected to a nail placed in the soil of the flower pot, and the negative secured to the upper part of the plant. The cactus brightened up after one week's treatment, and in two weeks was growing nicely. Further experiments were tried on rose and fuschia bushes with good results. The resistance of a plant is considerable, so that the flow of current is but a fraction of an ampere.

SPARKS—Current Facts, Figures and Fancy

(Plowing, clearing the sea of mines, and cutting coal are some of the newest applications of electricity; iron depositing bacteria, the housing situation in Germany and the telephone service in London are some current troubles which have not been so successfully handled at present, though one solution of the last named would seem to be Egyptian operators.—The Editor.)

Electrical and compressed air coal-cutting machines are shortly to be introduced into some of the coal mines of England, according to recent reports.

* * *

Copper production for the United States during August, 1919, is estimated at 102,000,000 lbs., or about 2 per cent increase over the previous month.

* * *

A regular commercial airplane service was recently instituted between Paris and London, carrying passengers and freight. A regular customs examination such as is given vessels precedes the flight.

* * *

The latest in banking is a deposit of two tons of sugar by a merchant whose storage space is limited. We have been realizing recently that sugar is a priceless commodity but hardly expected to see it competing with gold so undisguisedly.

* * *

Renting cells in the city jail is one of the recent methods of meeting the housing situation in Berlin. But somehow, if there is no greater choice of location than this, it would seem that the prospect of living rent free would be a direct incitement to crime.

* * *

Bacteria have been found to be active agents in the deposition of some beds of iron ore. Iron-depositing bacteria have been found responsible for the rusty masses which occasionally clog water supply pipes, and also for deposits in mine waters at a depth of several hundred feet.

* * *

Electricity is being widely used in clearing the North Sea of mines. Many of the mines are sunk very deep and have antennae which, when touched, cause the mine to explode. Special electric cables several hundred yards long are being used to explode these mines at a safe distance from the boat.

* * *

Transmission of energy by wireless waves is the goal of research now being conducted by a Roumanian engineer. In his experiments he uses a tube filled with liquid in which vibrations of the nature of sound waves are produced at one end and the energy is reconstructed in a mechanical form at the other

* * *

The recent centenary of James Watt brings to mind the fact that in addition to his work in the field of steam engineering, Watt was an able civil engineer, an instrument maker, a philosopher, the originator of the decimal system of weights and measures, and the inventor of a large number of mechanical devices.

Those who are discontented with the American telephone service should make a visit to England where it frequently takes from one to three days to get a long distance call. A caustic subscriber remarked recently that the quickest way to call the fire brigade in London was to send a postcard marked "Urgent."

* * *

A Danish inventor is working on a new invention to develop electrical power direct from the air. Such an invention would be rather a blow to the West, which is wont to rejoice in its superior water-power facilities. Almost any old place can boast of air,—except London, and perhaps the invention will work just as well with fog.

* * *

The longest news telephone line is operated from Chicago to Marquette and Houghton, Mich. The line is 600 miles long and is in operation two hours every night, transmitting during that period approximately 7,000 words of news matter including the scores of baseball games. The receivers type off the message just as it is read to them over the wires.

* * *

Electric plows are being tried out in Italy, and the trials have proved so satisfactory that it is probable electric plowing will become widely used. The cost has been shown to be less than one-third of the cost of the ordinary tractor work, and the fact that most of the fields are small and comparatively flat, and that the necessary power is available in practically every section of the country, makes Italy especially suitable for the experiment.

* * *

Telephone operators in Alexandria, Egypt, must be conversant with at least four languages before being employed, and this in spite of the fact that the average age of these girls is 18 and the joining age 16 years. A recent visitor to Egypt heard successively an Italian, a Greek, a Frenchman, an Egyptian, a Syrian and an Englishman call for numbers, each in his own language, and in no case did the connection take more than fifteen seconds.

* * *

A device to indicate the number of vacant seats in a street car or omnibus has recently been designed by a London man. On a dial indicator, operated by an iron tread on two of the steps, appears a number corresponding to the number of vacant seats. If figure 5 is shown and two persons descend the number automatically changes to 7. If another gets on, the figure 6 appears. We have only one fault to find with this, namely, that we have seen one passenger get out of a street car and leave two vacant seats.

PERSONALS

Herbert J. Flagg has been appointed chief engineer, Public Service Commission of the State of Washington. During the war he served as Captain, Coast Artillery, and for a considerable period he was stationed at Fortress Monroe, Virginia, instructing in the Coast Artillery School there. With the exception of his twenty-one months in the army, Captain Flagg has been with the Public Service Commission, as assistant engineer, since March, 1915. He was graduated from the College of Civil Engineering, University of Washington, in 1912. In the position of chief engineer for the Commission, Captain Flagg succeeds D. F. McCurrach, who resigned to enter private practice, specializing upon appraisal and rate-making lines.

M. C. Henderson, city electrical engineer of Dunedin, New Zealand, is a recent San Francisco visitor.

J. F. Kinder is on an extensive trip in Texas. Mr. Kinder is the Pacific Coast representative of the Ohio Vacuum Cleaner.

F. H. Murphy, illuminating engineer of the Portland Railway Light and Power Company, is in the East attending the Illuminating Engineers' Convention.

W. E. Roberts, ex-deputy city electrical inspector of Portland, Ore., is giving a course on the National Electrical Code at the Benson Polytechnical High School in connection with the night classes.

T. B. Cabell, a prominent salesman with the Electric Supply Company of Memphis, Tenn., is a recent San Francisco and Los Angeles visitor. Mr. Cabell has his business headquarters at Jackson, Miss.

John Barrett, director-general of the Pan-American Union for the last fourteen years, formally offered his resignation at a recent meeting of the governing board of the Union, effective next June 30th.

P. L. Boyer, formerly with the Salt Lake Hardware Company, has accepted a position with the Economy Fuse Manufacturing Company. He will cover the inter-mountain states and have headquarters at Salt Lake City.

J. H. Deppeler of the Metal & Thermit Corporation has been elected a vice-president of the American Welding Society, and P. F. Willis, president of the Henderson-Willis Welding & Cutting Company, has been elected a director of the Society.

M. J. Verdery, sales representative of the Edison Electric Appliance Company and chairman of the Salesmen's Auxiliary of the California Electrical Cooperative Campaign, has returned to San Francisco from a successful trip through Southern California.

O. T. McLean, who has been connected with the Northwest Utilities Company, has resigned, his resignation taking effect October 31. He will devote his entire attention to the Electric Service Company of Mankata, Minn., of which he is secretary and treasurer.

A. B. West, general manager, and **E. B. Criddle,** general agent of the Southern Sierras Power Company with headquarters at Riverside, are recent San Francisco visitors. Mr. Criddle has returned to Riverside, while Mr. West is spending some time on a vacation duck hunting trip in Utah.

W. H. Onken, Jr., editor of the Electrical World, has been an interested Pacific Coast visitor in recent weeks. He has addressed a number of electrical gatherings and has been assisting R. H. Ballard very materially in his efforts to form strong geographic sections throughout the country and also to further the company section membership in the National Association.

W. F. Durand, professor of mechanical engineering at Stanford University, who is serving as chairman of the San Francisco Section, A. S. M. E., has just completed a very interesting report on research statistics connected with activities of local mechanical engineers which has been forwarded to New York for consideration by the Research Committee of the Society.

M. H. Aylesworth has been appointed executive assistant to the president of the National Electric Light Association. For four years Mr. Aylesworth was chairman of the Colorado Public Utilities Commission, and recently was assistant to the vice-president and general manager of the Utah Power & Light Company, Utah Light & Traction Company, and Western Colorado Power Company, being in charge of public relations and public policy.

P. A. Roelofsen, a noted engineer of the Dutch East Indies, who is head of the Bureau for Waterpower and Electricity with headquarters at Bandoeng, Java, is a recent San Francisco visitor. Mr. Roelofsen is making a tour of the United States in the interest of railway electrification and nitrogen manufacture. He is accompanied by Walter Blaser, a prominent canal engineer of Java. They both expect to be back again in Java in about six months.

Wm. H. Snow, general manager, and **R. H. Barber,** chief engineer of the New Bedford Gas & Edison Light Company with headquarters at New Bedford, Mass., are both recent San Francisco and Los Angeles visitors. They are making a study of fuel oil installation with a view toward using this type of steam electric generation in their New Bedford installation. Mr. Snow and Mr. E. C. Jones, chief gas engineer of the Pacific Gas & Electric Company, entered the gas business together in 1881 back in Boston.

W. H. Easton of the Westinghouse Electric & Manufacturing Company with headquarters in New York City, has returned to his home city after a recent interesting visit to the Northwest. At the Seattle convention of the Northwest Electric Light and Power Association Mr. Easton delivered an interesting and instructive lecture on the uses of electricity featured by lantern slides and moving pictures. The subject of railway electrification, now of such vital interest to the economic welfare of the nation, was well brought out and enjoyed by all.

Roy J. Heffner, formerly captain in the Radio Branch of the Aircraft Service, has become associated with the extension division of the University of California and will have charge of technical instruction, to succeed H. H. Bliss, who will in future devote his entire energies to teaching work in the extension division. Mr. Heffner, fresh from executive duties in the military service where he had much to do with the organization of the aeronautic school at Berkeley, California, during the war period, comes to the new position brim full of new ideas of helpfulness, especially looking toward the extending of university courses to engineers not in residence at the University who desire to pursue further study. His field is a big one and much is expected of him. Strength to his strong right arm.

Lester S. Ready has been appointed assistant chief engineer of the California State Railroad Commission. Mr. Ready has been with the Commission for some years, as gas and electrical engineer. Previously he was with the distribution department of the Pacific Gas & Electric Company, San Francisco. He was graduated in 1912 from the University of California, College of Mechanics, and had the high honor of winning the University Medal, awarded each year to the most distinguished member of the graduating class. Mr. Ready's high intellectual ability as well as his extensive training and practical experience make him especially well qualified for his important new position.

Yone Nogachi, professor in Tokyo University, Japan, is at present visiting San Francisco.

F. D. Nims of the Northwest Electric & Waterworks, Seattle, is on a business trip through the East.

S. B. Anderson, treasurer of the Pacific States Electric Company, San Francisco, recently visited the Seattle branch of the concern.

Captain R. W. A. Brewer, construction engineer, is making a business tour during which he will visit New York City and other Eastern points.

A. W. Ambrose, petroleum technologist, of the Bureau of Mines at Bartlesville, Oklahoma, is visiting the San Francisco office and Pacific Coast oil fields.

W. E. Jones, district sales manager of the Economy Fuse Manufacturing Company, 935 Henry Building, Seattle, is visiting the Salt Lake offices of the company.

C. E. Grunsky, consulting engineer of San Francisco, and **Capt. C. E. Grunsky, Jr.**, have returned to the Pacific Coast after an extended engineering trip in Maine and the Eastern states.

A. A. Hammer, petroleum technologist, of the U. S. Bureau of Mines and in charge of the Bureau's office at Wichita Falls, Texas, is in California reviewing conditions in the Pacific Coast oil fields.

A. W. Leonard, president of the Puget Sound Traction Light & Power Company, and **D. C. Barnes**, manager of the Seattle properties of the company, have returned from a month's trip to California.

A. Lincoln Fellows, U. S. Government engineer, has been transferred from the Kern County District Irrigation Board which he has been serving for the last four months to the Madera Irrigation District.

H. J. Billaca, formerly with the Washington Water Power Company of Spokane, Wash., has joined the forces of the Western Electric Company in San Francisco, and is in charge of the Thomas Insulators.

Captain W. B. Mel, formerly valuation engineer for the Pacific Gas & Electric Company, has left for the Hawaiian Islands where he will be engaged in commercial and engineerin gphases of the fruit canning business.

Chas. Heston Peirson, publicity agent for the Southern California Edison Company, was one of those in attendance at the recent San Francisco banquet given in the interests of the California Electrical Cooperative Campaign.

J. T. Holmes, electrical engineer for the Pacific Marine & Construction Company with headquarters at San Diego, is a recent San Francisco visitor. Mr. Holmes' company has in charge the construction of several concrete ships at San Diego.

C. P. Bowie, petroleum engineer for the U. S. Bureau of Mines, in charge of the San Francisco office of the Bureau, returned to his headquarters after an extended trip through the Eastern and Mid-Continent fields reviewing oil-field activities.

F. M. Kerr, vice-president and general manager of the Montana Power Company, has been appointed by President Ballard as chairman of the Committee on Electrification of Steam Railroads for the convention of the National Electric Light Association.

H. A. Petterson, professor of hydraulic and sanitary engineering at the Pei Young University of Tientsin, China, has returned to China after spending several months in California where he was formerly engaged as a civil engineer on the Los Angeles Aqueduct.

Robert Sibley, editor of the Journal of Electricity, leaves in a few days for New York City to take part in conferences at the headquarters of the McGraw-Hill Company. Mrs. Sibley is to join him in New York. They plan to return to California before the Christmas holidays.

A. J. Frey, district manager of the U. S. Shipping Board, Southern Pacific District, with headquarters in San Francisco, resigns his position the first of the year. J. L. Ackerson, vice-president of the board with headquarters at Philadelphia, has not as yet announced Mr. Frey's successor.

R. F. Oakes, general manager of the National Carbon Company, headquarters in San Francisco, was a recent Seattle visitor. He had just returned from an extended trip to the eastern zone offices of the company in New York, and was on his way home. He visited the branch offices at Spokane, Seattle and Portland.

C. D. Slaughter of the Allied Industries, Inc., San Francisco, Los Angeles and Seattle, left San Francisco October 27th to visit the manufacturers of electrical materials which this company represents on the Pacific Coast, in the interest of closer cooperation between these factories and themselves, so that Pacific Coast requirements may have closer attention.

John A. Britton, Jr., who recently returned from an extensive business tour of the Orient, on November 12 addressed the Foreign Trade Club of San Francisco, telling his experiences in China, Japan, Siberia, the Philippines, and other lands of the Far East. Before entering the world trade field, Mr. Britton was with the Pacific Gas & Electric Company, as manager of the gas department in Oakland.

C. P. Deming, manager of the Seattle office, National India Rubber Company, recently visited the eastern Oregon and southern Idaho sections. He was at Baker and Pendleton, Oregon, and Twin Falls and Pocatello, Idaho. He reports considerable extension work being done by the Eastern Oregon Light & Power Company in the vicinity of Baker, including extensions to the mining section. The Idaho Light & Power Company is also active on extension work.

R. H. Ballard, president of the National Electric Light Association, and vice-president of the Southern California Edison Company, is coming to San Francisco to attend the Get-Together Dinner of the California Electrical Cooperative Campaign, Saturday evening, November 15th. **A. E. Wishon**, president of the Pacific Coast Section, N. E. L. A., and assistant general manager of the San Joaquin Light & Power Corporation, also plans to attend the banquet. **A. C. Balch**, vice-president of the same company, likewise is to be present.

OBITUARY

W. D. Weaver, former editor of Electrical World, died of heart failure at his home in Charlotteville, Va., Nov. 2, 1919. Mr. Weaver was widely known in the electrical industry throughout the nation and his loss will be sadly mourned.

R. W. Mackie of the sales department of the Western Electric Company, died on October 27th of typhoid fever.

Meeting Notices for Electrical Men

(The Southwest is prominent in this week's activities with two important meetings—the gathering in honor of Mr. Ballard, and the lamp agents' conference, both held in Los Angeles. Fresno was the scene of a very interesting meeting of the California Electrical Cooperative Campaign committees, and contractor-dealer organizations in the Northwest are consistently active.—The Editor.)

Oregon Association of Electrical Contractors and Dealers

The state executive committee of the Oregon Association of Electrical Contractors and Dealers met at Hood River, Oregon, October 17, 1919. Those present were: Roy Kenney, John Tomlinson, E. S. Colby and H. C. Jones. The application of The Dalles Electric Company of The Dalles, Oregon, was accepted. The secretary reported that Mr. H. William Herkstroter, representing the Industrial Finance Corporation of New York, had completed arrangements with the U. S. National Bank of Portland for handling the Morris Plan trade acceptances. The committee held on record as approving the plan of operation and the secretary was instructed to assist the U. S. National Bank in conveying to the members of the association information regarding the working of the Morris Plan.

A letter from Mr. O. B. Coldwell, Northwest Electric Light and Power Association, was read. It was suggested that the Oregon Association of Electrical Contractors and Dealers assist them in cooperation along various lines, and the association was asked to secure large attendance of its members at the national convention of the N. E. L. A. to be held in Pasadena next year. The committee went on record as favoring any bond of cooperation that may be devised between the two organizations and will start a campaign early in 1920 to insure a good attendance of its members at the Pasadena convention. Mr. Roy C. Kenney was appointed as division executive committeeman. The appointment of H. C. Jones as state secretary was confirmed.

BUILDERS OF THE WEST—LXV

AURELIA H. REINHARDT

It is fitting in this issue of the Journal of Electricity, devoted in large measure to problems of lightening the labor in the home, that we pause in the technical discussion of problems of electrical application to voice the profound respect and admiration of this great industry in the West for those who have a vital part in rearing and educating the future housewives of America. To Aurelia H. Reinhardt, president of Mills College, devoted mother of two children and kindly godmother to ever increasing hundreds of young womanhood, this issue of the Journal of Electricity is affectionately dedicated in lasting appreciation of her ideals of responsibility in citizenship and in the home she is inculcating among the young women of America.

American Association of Engineers

A new local chapter of the American Association of Engineers is being organized at the Oregon Agricultural College at Corvallis, Oregon. They expect to have 600 members. Student members enjoy all the rights and privileges of regular members—except the right to vote. Dues are $3.00 per annum, with no initiation fee. The local chapters elect their own officers and govern themselves in all matters as regards local policies, etc., curbed only by constitutional limitations. Mr. R. W. Barnes recently went to Corvallis to help them with their organization.

Electrical Cooperative League Dinner in Honor of R. H. Ballard

His associates in the Southern California electrical world gathered at the Alexandria, Los Angeles, on October 29th, to welcome home R. H. Ballard, president of the National Electric Light Association. The dinner was in recognition of the securing by Mr. Ballard of the next convention of the association for Pasadena, where it will meet May 18 to 21, 1920.

A. Emory Wishon, president of the Pacific Coast section of the National Electric Light Association, took up his duties as toastmaster of the dinner after being introduced by Ralph B. Clapp, president of the Electrical Cooperative League, under the auspices of which the dinner was held. Mr. Wishon called upon John Willis Baer, as representing the chairman of the Pasadena city commission, and Dr. Baer extended the hearty welcome of the city to the convention and told of the pleasure it would be to the people of Pasadena to have so great a gathering meet in their city.

The guest of the evening, "Russ" Ballard, told his hearers of the way Eastern capital and business were beginning to regard California. With especial regard to the electrical industry and the coming of the convention he said:

"California is the center of interest in the electrical industry, with its western spirit of confidence, optimism, courage and audacity, its great power developments, wonderful possibilities and expanding market for the power as developed.

"Money to finance these projects must come largely from the East, attracted by sound financial conditions, the result of satisfactory returns to investors from payments by contented consumers.

"Eastern operators and investment bankers attending the national convention at Pasadena next May will gain intimate knowledge of Western conditions, and water power development and steam railroad electrification will be features of the convention.

"Two hundred and fifty million dollars can be used to advantage in electrical developments in California in the next ten years, half of which would be spent in the state for wages, raw materials and manufactured products. Large manufacturing industries would be attracted, thousands of acres of land irrigated, hundreds of thousands of homes electrically equipped from cellar to garret, making labor more productive and helping to solve the servant problem."

Other speakers were Ben M. Maddox, vice-president of the Mt. Whitney Power & Electric Company; William Baurhyte, first vice-president of the Los Angeles Gas & Electric Company; Glenn Arbogast, president of the Dealers and Con-

The Welcome-Ballard-Home dinner held in Los Angeles on October 29 was one of the best attended gatherings of the season. A number of able and prominent speakers and a well-rounded entertainment program made the meeting pass off with the greatest success.

tractors' Association; K. E. Van Kuran of the Advisory Committee of the California Electrical Cooperative Campaign; Charles Heston Pierson, publicity manager of the convention; William H. Onken, Jr., editor of the Electrical World, and E. B. Criddle, general agent of the Southern Sierras Company.

San Francisco Electrical Development League

At the October 27th meeting of the San Francisco Electrical Development League, Charles F. Newsom, division commercial manager of the Western Union Telegraph Company, spoke on the possibilities of improving business by employing the telegram. He pointed out that by use of telegrams, instead of letters, any business firm could gain 100 additional opportunities during the next year. After his talk, Mr. Newsom answered questions submitted to him by the members. Joseph Mulvihill, of the San Francisco Board of Supervisors, was a guest of the meeting and spoke a few cordial words in reference to electrical development.

The luncheon meeting of November 3rd was addressed by W. H. Onken, Jr., editor of the Electrical World. Mr. Onken's speech, on "The Value of Publicity to the Electrical Industry," is reproduced elsewhere in this issue. John A. Britton, vice-president and general manager of the Pacific Gas & Electric Company, acted as chairman of the day, and in introducing the speaker he paid a tribute to the services of the technical press in the upbuilding of the industry.

Electrical Contractors and Dealers' Association of San Francisco

Regular meetings of the San Francisco association, held on October 31st and November 7th, were taken up mainly with discussion of practical policies of the association. At the latter session W. D. Kohlwey, chairman of the retail section, announced that the retailers have perfected permanent organization, with a membership approaching forty. M. A. DeLew urged all members to attend the California Electrical Cooperative Campaign dinner on November 15th in San Francisco.

H. H. Courtright, of the Valley Electric Company, Fresno, who was a visitor at the meeting, spoke on the satisfactory condition of the industry in Fresno and vicinity.

National Electric Light Association

An important item in N. E. L. A. affairs is the work of the special committee on Geographic Sections, under the direction of Vice-President M. R. Bump. This committee recently submitted a tentative layout dividing the country into twelve Geographic Sections. An active campaign is now being carried on with prominent members in each proposed section in order that this work may be consummated by the time of the Pasadena convention.

The committees of the National Special Sections are all actively at work, no less than fifteen committee meetings being held during October, and a large number of future meetings are already scheduled, reaching into February, 1920.

Chairman Birch of the Company Sections Committee reports unusual activities along this line, a number of the older Sections getting down to a pre-war basis and many new Sections being organized. Reports on a number of these will appear in the next issue of the Bulletin.

LOS ANGELES LAMP AGENTS' CONFERENCE

A meeting of Edison lamp agents and local agents of the Southern California Edison Company was held at the Jonathan Club, Los Angeles, October 28. The meeting was called to order by J. O. Case, local manager supply department, General Electric Company, who talked on "Self-Interest" and the possibilities for the electrical contractor-dealer and lamp agent. He introduced C. E. Spaulding, local manager of the Edison Lamp Works, who acted as chairman. Mr. Spaulding talked on Sales Helps, such as the advertising material which the Edison Lamp Works offer their agents.

F. D. Fagan, distrcit sales manager, Edison Lamp Works, talked on the aims and objects of the meeting. He brought out the importance of getting together and exchanging ideas for increasing the incandescent lamp business, and also dwelt on the importance of a standard of better illumination, both for the industrial and the home.

W. L. Frost, assistant general agent of the Southern California Edison Company at Los Angeles, chose the subject, "What the Central Station Expects of the Lamp Agents." Mr. Frost's interesting talk brought out the importance of agents selling the proper voltage lamp for the circuit. At the conclusion of this address there was considerable discussion on the voltage question, which resulted in the jobbers and manufacturers deciding to standardize on 110 volts as the proper voltage lamp to be supplied on the circuits of the Southern California Edison Company. Mr. Frost also pointed out the fact that even though the Southern California Edison Company had discontinued giving free renewals, they were still receiving orders for large quantities of Mazda lamps, which business he would be glad to see go ot the lamp agents. At the close of Mr. Frost's talk, Mr. Fagan made the statement that there was no question but that the management of all of the electrical dealer-contractors and lamp agents of Southern California appreciated the cooperation of the Southern California Edison Company and realized what their change of policy from free renewals to selling Mazda lamps at list prices meant to the dealer, but called to the attention of those present that possibly the clerk, the salesman or saleswoman in the agents' stores did not appreciate the assistance the central station had been to the dealer, and urged the managements to impress this point upon their employes. When a complaint from the central station cus-

tomer was made against the central station, he said, the lamp agent's representative ought to take the part of the central station and endeavor to convince the customer that the central station was willing and ready to do the right thing by the customer and give him the very best service possible; and if they considered it important enough, to call the central station's attention to the particular customer's complaint so that they might rectify any mistake or misunderstanding.

F. J. Airey of the Pacific States Electric Company talked on the subject of the agents tying-in local advertising in newspapers, show windows and other mediums, with the national magazine advertising done by the manufacturers.

A sales demonstration, showing the correct and incorrect methods of selling, was put on by F. D. Fagan and C. E. Cayot of the Edison Lamp Works.

At the close of the meeting an informal dinner was served in the dining room of the Jonathan Club.

A. S. M. E., San Francisco Section

An important meeting of the San Francisco Section, American Society of Mechanical Engineers, was held at the Engineers' Club in San Francisco on October 30, 1919. Two interesting papers were presented, "Flow of Oil Pipe Lines" by Dr. Wm. F. Durand, and "Pipe Line Design and Economics" by H. W. Crozier.

California Electrical Cooperative Campaign Committees

An unusually helpful and enjoyable meeting of the Advisory Committee of the California Electrical Cooperative Campaign was held at Fresno and at Crane Valley Dam on

After the meeting of the California Electrical Cooperative Campaign at the Crane Valley Dam, the members of the Advisory Committee and their guests were shown over the new work of the San Joaquin Light & Power Corporation. Real thrills were experienced as the men were lowered down 2000 ft. into the canyon where the Kerckhoff dam is being constructed in record-breaking time. In the view from left to right are: I. W. Alexander, R. M. Alvord, H. R. Noack, Capt. Howard Angus, M. L. Scobey, P. M. Downing, M. A. DeLew, R. C. Starr, Glenn E. Arbogast, with A. Emory Wishon shown seated on the right.

November 25th and 26th, 1919. There were present at the meeting the following:

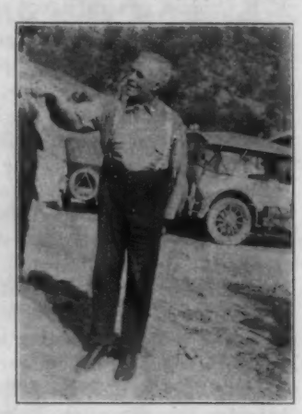
M. L. Scobey, G. B. McLean, E. B. Walthall, H. H. Hughes, A. W. Childs, L. H. Newbert, Harry Noack, L. I. Quinn, I. W. Alexander, Mr. Nickson, D. E. Harris, W. M. Deming, G. R. Kenny, Robert Sibley, J. J. Gibson, J. E. Cleary, H. H. Courtright, A. E. Wishon, C. D. Lamoree, Howard Angus, M. E. Newlin, M. A. DeLew, A. E. Wishon, Carl Heise J. E. Johnston, G. E. Arbogast, and R. M. Alvord.

At Crane Valley Dam the entire committee was entertained most royally by the San Joaquin Light & Power Corporation. A barbecue dinner on Saturday night and a chicken breakfast on Sunday morning served to brighten the hearts and stomachs of all those taking part in this interesting work.

After the morning session Sunday morning, the committee as a whole was taken over the new work of the San Joaquin Light & Power Corporation, including the building of the giant Kerckhoff Dam. Needless to say the courtesies of the San Joaquin Light & Power Corporation were enjoyed to the fullest extent, and the members of the committee were loud in their praises of the very efficient work that is now being undertaken by the San Joaquin Light & Power Corporation in its efforts to deliver additional power service to its consumers who are now crying by the hundreds for more power supply.

Just to give an exciting pose A. Emory Wishon, assistant general manager of the San Joaquin Light & Power Corporation, and Robert Sibley, editor of the Journal of Electricity, were sent out over a hazardous aerial trolley ride above the San Joaquin River at the Kerckhoff Dam.

An unusual and rare treat was enjoyed by the committee members in the personal visitation with the committee of John J. Gibson, manager of the supply department of the Westinghouse Electric & Manufacturing Company of East Pittsburgh. Mr. Gibson not only listened attentively to the discussions of the committee, but also contributed many helpful suggestions for the future work of the campaign.



A. W. Childs, of the Southern California Edison Company, was always telling some fish story. Well, here he is putting over one pretty near half his height. But alas! the fish shown fading off to the left in this view was not one of his own catching for it is a huge salmon speared by some Indians in the San Joaquin River, just as the party was leaving San Joaquin Power Plant No. 1.

A quiet little game of "seven-come-eleven" was played, too, whenever tire trouble gave occasion for a stop along the route. We refrain from naming those shown in the view. Can you pick them out?

Among the important work accomplished by the committee in its session was that of the adoption of a standard form for rating of the various contractor-dealers throughout California; and, also, the discussion of new and effective means of publicity that will tie-in with all phases of activity in the electrical industry in the West.

The Value of Publicity to the Electrical Industry

BY W. H. ONKEN, JR.

(The time has come for the electrical industry to take its rightful place not only in the activities of the world but in the estimation of the public. In the following address delivered before a recent meeting of the San Francisco Electrical Development League the editor of Electrical World emphasizes the importance of publicity to the attainment of this end.—The Editor.)

Out of the sagebrush and deserts of Arizona, Nevada and New Mexico and from the fertile fields of California has come many a vision. Indeed only a dreamer could see the relationship of the snow-capped mountains and deep canyons to the distant civilization, and only a pioneer could have the hardihood to interpret the dream. And what has been the result?

You have wrested from the melting snows of the high Sierras their God-given power and converted it into electricity for the use of man. You have transmitted that energy across ravine and canyon and expansive wastes to far-off cities and made every village and hamlet along the right of way tingle and glisten under its magic impulse. Through its agency you have brought water to the parched earth and there have sprung up orchards and vineyards and olive yards and fields of succulent alfalfa, vegetables and herbs to give sustenance to man and beast, where before there was naught but bare land.

Here you have the fruition of that prophecy of Isaiah: "The wilderness and the solitary place shall be glad for them and the desert shall rejoice and blossom like the rose." Compare, if you will, the murmur of these harnessed mountain streams with the roar of the thousands of industries set in motion by the potent force of electricity generated from them.

Electricity and Current Problems —

These are the realities; and yet the realities are small compared with the possibilities. Remove, for instance, the fetters which encompass the waters on the public domain in this Western country, give willing hands the right to work, the right to build, expand and develop, and the electrical industry, which alone can utilize these natural resources without destroying them, will create a greater and more powerful industrial empire.

Today social disorder and industrial unrest strut through the land. Housemaids are disappearing and labor demands more for its hire. Men everywhere are seeking a solution and heroically endeavoring to ward off impending revolution and chaos.

Electricity can be used effectually to stem this turbulent tide. By its means household drudgery can largely be removed and a servantless home become a pleasure instead of a curse. Washing, cleaning and cooking are made easy if performed electrically and become almost a pleasure. Applied to the shop and to industrial processes, electricity increases production. And what is more necessary at this present moment in this country than increased production? It is useless to complain of the high cost of living or to strive vainly to reduce it unless production is increased.

Moreover, since electricity enables a laborer to produce more in a given time, by the same token it permits him to earn more and to earn it honestly. Electricity is a panacea applicable alike to the finest needle that ever wove its way through the most delicate fabric, or to the most ponderous liner that ever plied its course across the mighty ocean.

The Call for Cooperation —

Possessing the knowledge, experience, judgment, ability and skill to perform all these wonders, ought we to remain quiescent and permit the dreams, ambitions and aspirations of those pioneers and geniuses who have blazed the trail before us, to be shattered because we are recreant to the obligations handed down to us? Our industry has had a wonderful development and if it is to continue to develop, expand and grow, all branches of it must work together in all fairness and justice for the common good.

"One for all and all for one" should be the slogan. I care not if a man be a manufacturer, jobber, contractor, dealer, or the representative of a public utility, speaking by and large he cannot be more successful than the industry of which he forms a part unless, perchance, he is a genius. Hence the need for cooperative movements such as those which exist in this city and state.

Our industry is a complex one, however, and unless we are very careful we are apt to lose our sense of perspective. The success of the whole electrical business hangs on the success of the electric public utilities in the various communities. Our electrical manufacturers have an invested capital of approximately $750,000,000 while the electric public utilities of the country alone have upwards of two and a half billions of capitalization. Hence a setback in the central station industry is felt all along the line.

The central stations of California can employ profitably $25,000,000 a year for the next five or ten years on new developments and extensions if they can raise the money. This means added business for manufacturers and added opportunities for jobbers, dealers and contractors, not to mention the added comforts and industries which accrue to the state.

The Position of the Central Station —

One would think that this dependence of the other branches of the industry on the success of the public utilities was so apparent that it would need no elaboration. Such is not the case, however, and it is necessary to reiterate time and again that no matter what other branch of the electrical industry you may be engaged in, your bread and butter depend very largely on the expansion and continued growth of the central station industry. And unless the public utilities extend and reach out into new fields in anticipation of the demand for the service that is sure to follow, there will be very little field for the sale of electrical apparatus and supplies.

There is an old saying which aptly fits the situation:

"For want of a nail, the shoe was lost;
For want of a shoe the horse was lost;
For want of a horse the rider was lost;
For want of a rider the kingdom was lost;
And all for want of a horse shoe nail."

The horse shoe nail in this case is the money necessary for the development and expansion of the central station industry.

As you all know, the street railway business is in a deplorable condition, and if the trend of public opinion is against granting fair rates on capital invested in the electric public utility field, with the cost of labor and material increasing, the electric lighting companies will find themselves in like straitened circumstances. Of course they look for relief to the Public Service Commissioners. And if the Public Service Commissioners refuse to grant adequate rates to an electric lighting company—admitting, of course, that such increases are necessary and that every economy known to the art has been practiced—it is because enlightened public opinion is lacking.

The Force of Public Opinion —

The arousing of proper public sentiment is the most important thing that a body such as this can undertake and

hence the subject assigned me, "The Value of Publicity to all Elements of Our Industry."

Public opinion is the ultimate force that controls the destiny of this country and its institutions. No man or set of men may with impunity defy public opinion. No law can be enforced contrary to its behests, and even life itself is hardly worth living without its approbation.

Therefore, if we as a united industry possess ideals, are patriotic, recognize our public duty and truly represent American spirit and altruism, we have a right to expect public confidence and we shall not be disappointed in our hope. However, a good reputation is predicated on good deeds—and every effort should be made to win public support.

"Good name in man and woman, dear my lord,
Is the immediate jewel of their souls;
Who steals my purse, steals trash; 'tis something, nothing;
'Twas mine, 'tis his, and has been slave to thousands;
But he who filches from me my good name
Robs me of that which not enriches him
And makes me poor indeed."

Confidence and Accomplishment —

Now, how can public support be gained? In devious ways; but time would not permit even a brief enumeration. But back of them all must be honesty and integrity. Nothing else really matters. Dishonesty may succeed for a time or temporary prosperity be attained by unworthy methods, but, no matter what the rule may be for the short run, in the long run (and we are engaged in a business that is here for a long time), honesty and square dealing will win out if the public is properly informed.

There is every reason why we should feel optimistic about the outcome. We seek no mean advantage and expect only what is our due. Ours is a vocation for optimists. Idealism is the very stuff we thrive on. There is no room for pessimists in the electrical industry. Having faith and financial resources, success is certain. What better calling could a man want?

Is there any profession more ennobling or intrinsically more valuable to mankind? We are apt to think of a physician's calling as being ideally human and satisfying, and I will admit that it must be comforting to feel when humanity about you is in pain and travail that you possess the skill and knowledge to relieve suffering. I can envy a conscientious physician the glory and comfort which must be his. A lawyer likewise may take commendable pride in applying his knowledge of jurisprudence in righting wrongs and establishing justice and peace between man and man. But ought the proponents of electricity to be one whit less enthusiastic or assertive in their particular calling?

Isn't ours the greatest task an ambitious person with ideals can find? Helping the individual, helping the community, helping the state and nation, and at the same time making a worldly success for one's self?

Let the central station companies adopt for themselves the principle of public trusteeship. Let them gather the best equipment of machinery and personnel that money can command. Let them bring continuously into play the qualities and conditions which tend to maximum business efficiency. That is, experience, knowledge, special training and the zeal arising from opportunity and self-interest, so that by a combination of all these, economies of operation and of finance will result in the production of a unit of energy at less cost than anyone else can make it. (For when all is said and done, this is the only justification a central station has for existence.)

Then let the public utility distribute that energy, together with a complete knowledge of its uses, not as masters but as servants of the public, working for wages and conscious that it has a commodity that will work miracles. All that you can ask, all that you can expect, is a fair return on the investment necessary to produce and distribute that commodity, and the public for its part is protected in its rights to efficient service and fair rates by duly appointed regulatory bodies.

Letting the World Know —

Show the world what electricity can do. We know that we have something worth while. We know there is no other form of lighting and power that can outrival it. We know it isn't costly, and why should we be afraid or backward in letting every one else know? The story of what electricity can and will do should be published broadcast by every means known to the ingenuity of man.

This is a campaign in which central station, jobbers, manufacturers, dealers and contractors can cooperate. This cooperation should be whole-hearted in word as well as in deed, so that the industry may present a solid and unified front to the world.

A unity of honest method.
A unity of laudable purpose.
A common area of valid, incontrovertible fact.
And no demagogue or adverse public opinion can withstand the onslaught.

Public reason depends on contact with objective information, not what somebody says, not what somebody wishes were true but what is true beyond the peradventure of doubt, constitutes the basis of public sentiment and judgment. "Ye shall know the truth and the truth shall make ye free." The demagogue, my friends, is only an undetected liar.

Any publicity campaign to be effective must be conceived and executed on a grand scale. Petty jealousies and narrow-mindedness must play no part in it. Frankness must be everywhere apparent. The primary object must be to develop the community and the state and not the particular business in which we are engaged. We must honestly believe in the righteousness of our cause and have faith to know that the community or state cannot advance without pulling us with it.

We must above all else be genuinely enthusiastic.

REGISTERED ENGINEERS

The Oregon State Board of Engineering Examiners at a meeting held October 3, granted certificates of registration, permitting the holders to practice professional engineering in Oregon, to 132 engineers. These are the first applicants to be accepted under the license law passed last winter which requires that all wishing to practice professional engineering in the state after January 1, 1920, hold such certificates. A list of those granted certificates follows:

H. E. Abry, J. H. Abbott, W. W. Amburn, C. Anderson, B. C. Ball, J. E. Butler, J. O. Baar, M. A. Baker, J. H. Ballweg, R. H. Baldock, P. W. Beasley, G. S. Beatty, M. O. Bennett, C. W. Boschke, L. Bergsvik, W. Bollons, G. W. Buck, W. E. Burkhalter, R. C. Bonser, G. H. Binkley, C. R. Beardsley, C. H. Benson, C. L. Brown, J. A. Currey, A. B. Carter, R. E. Cushman, S. B. Cathcart, D. D. Clarke, J. W. Cunningham, O. Cutler, J. J. Cullinan, R. I. Campbell, J. C. Cleghorn, W. H. Cullers, B. C. Condit, R. H. Coppock, J. H. Cary, J. J. Dickson, C. O. Diffenderfer, E. I. Davis, W. E. Eddy, F. W. Eichenlaub, C. S. Edmondstone, N. H. Entler, J. W. Ferguson, C. F. Fisher, D. G. Glass, J. N. Gearhart, S. Geijsbeek, A. K. Grondahl, D. R. Groves, F. C. Green, G. G. Hall, J. V. Halas, J. R. Hanson, A. Hadley, R. E. Hickson, W. S. Hodge, F. E. Hogan, H .M. Howard, G. A. Hoppe, D. C. Henny, J. F. Joyce, C. I. Kephardt, F. G. King, O. A. Kratz, R. E. Koon, C. P. Keyser, H M. Lull, R. Lenoir, A. M. Lupfer, W. W. Lucius, Charles McGonigle, R. A. McClanathan, E. B. MacNaughton, A. J. McMillan, J. F. Meager, H. D. Hillis, E. T. Mische, W. E. Morris, O. B. Misz, S. Murray, G. C. Mason, W. H. Marsh, A. E. McKennett, J. B. Madden, W. I. Morrison, A. R. Moore, C. G. Nash, W. C. Nicholas, J. E. Nelson, J. P. Newell, H. Nunn, A. F. Perry, G. F. Parker, J. E. Peck, T. Pumfrey, D. K. Plowman, R. A. Pratt, V. H. Reineking, A. H. Richmond, C. M. Redfield, E. D. Roberts, H. J. Roberts, D. H. Rowe, F. M. Randlett, C. N. Reitze, O. E. Stanley, R. I. Stout, G. I. Stebbins, C. F. Swigert, E. L. Strange, C. P. Smith, C. H. Smith, S. Smyth, A. S. Tee, C. F. Thomas, E. B. Thomson, W. S. Turner, E. L. Vinton, C. F. Waite, J. F. Waller, L. D. Williams, C. R. Wright, F. P. Wentz, E. Withycombe, H. C. A. Worrell, J. E. Yates, H. W. Young.

Mr. O. Laurgaard, president of the Board of Engineering Examiners, says that 360 applications have been filed, and that a total of 750 inquiries regarding the law have been received by the Board. He estimates that between 700 and 800 engineers will have been registered before the first of next year, after which time applicants will be required to pass examinations before certificates are issued.

HAPPENINGS IN THE INDUSTRY

REORGANIZATION OF FEDERAL ELECTRIC COMPANY

The Federal Electric Company was established at Chicago in 1899 as a manufacturer of sockets, bushings and specialties and later engaged in the manufacture of electric appliances and electric signs and all devices relating to load building of power companies. An unusual and novel electric sign was developed by the Federal Electric Company which was of such a nature that another corporation was formed for its marketing, known as the Federal Sign System (Electric). For many years the two corporations existed side by side and the Federal Sign System (Electric) became the marketing corporation for the Federal Electric Company and at a still later date purchased the Federal Electric Company and merged it with the Federal Sign System (Electric). Continued growth of the company's business in lines not related to electric signs was such that the volume of sales outside of the electric sign line far exceeded the electric sign business, and therefore the corporate name became a misnomer and changes are now taking place in the various subsidiary corporations, incorporated in various states, to change the name to Federal Electric Company.

This change has been completed in the Western division, which is controlled by the California corporation, and as soon as legal arrangements are made the change will be complete in all of the various corporations, as the company adopts the policy of separately incorporating in the various states wherever there is any advantage in so doing. The officers of the Western corporation comprise J. M. Gilchrist, president; H. I. Markham, treasurer; B. Ohlsson, secretary; T. W. Simpson, vice-president and western district manager; the directors comprise all of the above with Mr. John A. Britton. The company owns an electric sign factory and warehouse at Oakland, an electric sign factory and warehouse at Seattle, warehouse and supply headquarters at San Francisco, and branch sales offices at San Francisco, Oakland, Portland, Seattle and Salt Lake City.

In announcing the establishing of a full line jobbing and supply business in San Francisco, the company states:

"This company has selected certain centers for engaging in full line jobbing and it is not the intention to make shipments from the centers which have been selected for this activity into other jobbing territory where the company is not represented by complete facilities. It is not the intention of the Federal Electric Company from its jobbing and supply headquarters at San Francisco to sell outside of what is known as the San Francisco jobbing district. In other jobbing districts of the West it plans to continue the same policy as heretofore, namely, market Federal manufactured lines exclusively. The fact that the company has a large number of sales offices does not mean that it will disturb the existing jobbing conditions by long distance shipments outside of what is generally recognized to be present jobbing zones, as the company recognizes that to do so would render it impossible to give proper service in territories widely separated from the supply warehouse and headquarters."

COMMITTEE FOR REVISION OF ELECTRICAL UTILIZATION SAFETY ORDERS

The Committee for Revision of Electrical Utilization Safety Orders, appointed to cooperate with the California State Industrial Accident Commission, has been fully organized and is now active in its work of study and investigation. S. J. Lisberger has been appointed chairman, and during his absence in the East, Arthur Kempston is acting as temporary chairman. R. L. Eltringham, of the Commission, is secretary of all committees. There has already been a meeting of the general committees, besides three sessions of sub-committee chairmen. On November 6th, the Committee on Services met in the rooms of the Industrial Accident Commission, with Arthur Kempston as chairman.

As both the southern and the northern section of the state are represented on the committee, and as each section desires to have a part in the drafting of the rules, it has been proposed by the chairman that the following method of procedure be followed:

That the chairmen of the several sub-committees located in the North will proceed with drafting their rules with as many committeemen as they can get in their own immediate section. The rules so drafted by them will then be turned over to the secretary, Mr. Eltringham; he will take them South, and there take up these rules with the representatives of the General Committee in the South. The General Committee representatives in the South will call a meeting of those affected by the rules, such as other contractors, dealers, jobbers, engineers, etc., and in the South they will discuss the rules as prepared by the North. The secretary will then bring these rules back North with him and they will be submitted to the Northern members for revision, etc.

Likewise the chairmen of the sub-committees in the South will proceed to draft their rules, and these will be transmitted through the secretary to the northern members, as before outlined. "All of the sub-committees are requested to give publicity to their meetings," says Mr. Lisberger, "in order that they will get full representation from the industry in drafting the rules. While the Main Committee is a representative one, it has been impossible to include many men whose services will be of value in drafting the rules, and it is hoped that these men will be called upon in order that the committee may get the benefit of their experience. It is also hoped that anyone having any thoughts regarding necessary rules under any general subject will transmit his opinions in writing to the chairman of the sub-committee, in order that they may be formulated into the Code."

The make-up of the General Committee is as follows:

S. J. Lisberger (chairman), Pacific Gas & Electric Company, San Francisco; R. H. Manahan (vice-chairman), City Electrician, Los Angeles; Arthur Kempston (temporary chairman), Chief Department of Electricity, San Francisco; H. W. Stitt, City Electrical Inspector, Fresno; Carl E. Hardy, Superintendent Department of Electricity, Oakland; T. B. Lewis, Southern California Edison Company, Los Angeles; C. W. Mitchell, Electrical Engineer, Board of Underwriters of the Pacific, San Francisco; J. C. McCaughern, Assistant Secretary, Board of Underwriters of the Pacific, San Francisco; C. E. Flenger, Plant Engineer, Pacific Telephone and Telegraph Company, San Francisco; E. E. Brown, San Francisco; G. E. Arbogast, Los Angeles; Morris M. Bruce, San Francisco; W. W. Hanscom, Consulting Engineer, San Francisco; B. B. Beckett, Palo Alto; J. H. Clover, San Francisco; James McKnight, San Francisco; Lloyd Henley, Assistant Engineer, State Railroad Commission, San Francisco; R. A. Balzari, Westinghouse Electric & Manufacturing Company, San Francisco; M. C. Hickson, General Electric Company, San Francisco; E. M. Schlesinger, San Francisco; Samuel A. Russell, H. B. Squires Company, San Francisco; C. A. Jordan, Oakland; R. E. Swain, Pacific District Council, I. B. E. W., San Francisco; W. T. Bivins, San Francisco; B. C. Hill, Supervising Inspector, Electrical Department, City of Oakland; T. A. Panter, Assistant Electrical Engineer, Bureau of Power and Light, Oakland; George F. Flatley, San Francisco; Charles W. Hillis, Electric Appliance Company, San Francisco; H. M. Wolflin, Superintendent of Safety, Industrial Accident Commission, San Francisco; Robert L. Eltringham (secretary), Electrical Engineer, Industrial Accident Commission, San Francisco. Temporary appointments: Amos H. Feely, Business Agent, Local Union 378, I. B. E. W., San Francisco; W. H. Pierce, Intern Organizer, I. B. E. W., Los Angeles. Alternates: Daniel W. Martin, P. H. Affolter, A. E. Rowe, H. L. Yost, John W. Carrell.

The sub-committees which have been organized cover the following subjects: Scope; Definitions; Meters and Meter Boards; Branch Circuit Distribution; Feeds, Sub-Feeds and Distribution Centers; Garages, Public and Private; Motor Control and Protection; Motor Installations; Heating Devices; Lighting Fixtures and Appliances; Generators and Rotary Converters; Transformers, including Vaults; Rectifiers, Mercury Arc, Vibrating, Electrolytic; Storage Batteries; Electric Haulage Equipment, Cranes, Elevators, Conveyors, Stackers and Similar Equipment; Signs and Outline Lighting; Theaters and Motion Picture Establishments; Signal Communication Systems; Radio Communications; Electro-Therapeutic and X-Ray Equipment; Conduit; Open Work and Concealed Knob and Tube Wires; Metal Raceways; Substations, Overhead and Underground Lines.

At the organization meeting of September 6th, the following resolution, submitted by Arthur Kempston, was adopted by the General Committee:

Whereas, It is highly desirable to provide a single set of rules and requirements embodying the present "Electrical Utilization Safety Orders," issued by the Industrial Accident Commission of the State of California, and the "National Electrical Code" as recommended by the National Fire Protection Association; and

Whereas, The continuation and recognition of existing national standards for fittings and material, as well as the methods of instailation, is of the utmost importance; therefore be it

Resolved, That these principles are hereby adopted by this Committee as its policy, and that all rules and requirements proposed by subcommittees comply with the following:

1st: That the present form of the "Code" and "Safety Orders" be disregarded and a new form adopted providing for the grouping of all rules relating to a subject under the title of that subject; also that the subject titles relate to the classification of the installation such as "Service," "Motors," "Fixtures," etc., and not as to materials used.

2nd: That, in order to permit cities, towns or other political subdivisions to require, within the rules and requirements, such higher grades of installation as determined by their legislative bodies to be desirable, the rules prepared shall provide minimum requirements and shall include recommendations for major requirements, thus permitting a selection within the rules in such instances.

3rd: That all rules be written in language clearly understood by an average electrical worker, be mandatory in form and explicit in requirement.

4th: That, in the preparation of rules and regulations by subcommittees, there be a minimum deviation from present practices except such rules recommended by subcommittee and approved by general committee.

5th: That the specifications for fittings and material contained in Class "D" of the "National Electrical Code" be unchanged and provision directly made for recognition of the labels issued by the Underwriters' Laboratories, both fire and accident, with provision for condemnation of substandard and unsafe devices.

WESTERN ELECTRIC ANNIVERSARY

In November the Western Electric Company celebrates the 50th anniversary of its founding. In 1869 the firm of Gray & Barton was formed to manufacture telegraph instruments, bells and buzzers, and from these small beginnings, at the time when the commercial applications of electricity were in their infancy, the present company has developed until now its activities cover the entire world.

ENGINEERS' EXAMINATION

An examination will be held on December 5th, 1919, at 520 Corbett Building, Portland, Oregon, for all professional engineers who are unable to meet the requirements without examination, of the Act of the Legislature of the State of Oregon, 1919, Chapter 381, requiring all professional engineers to be registered after January, 1920.

Necessary blanks for application to take the examination may be had upon request from A. B. Carter, Secretary State Board of Engineering Examiners, 420 Corbett Building, Portland, Ore. All applications to take the examination given on December 5, 1919, must be filed with the State Board of Engineering Examiners at least thirty (30) days before December 5, 1919.

TRADE NOTES

New Offices —

The Brokaw-Eden Company, manufacturers of the Eden washing machine, have opened new division offices in San Francisco at 733 Rialto Building.

Foreign Agent —

The Roller-Smith Company, main office and export department at 233 Broadway, New York City, manufacturers of electrical protective and measuring apparatus, announces that it is now represented in Cuba by Martinez Cartaya & Bueno, located at Muralla 40, Havana, Cuba.

Martinez Cartaya & Bueno, who represent also the Wagner Electric Manufacturing Company, will handle the Roller-Smith products of electrical measuring instruments, watthour meters and circuit breakers on an exclusive agency basis for the entire island of Cuba.

New Orders —

The Electric Furnace Construction Company, Finance Building, Philadelphia, advises orders received for "Greaves-Etchells" electric furnaces from Lacheze et Fils, Dijon, and C. Markham & Co., Ltd., Chesterfield.

Industrial Survey —

Holbrook, Merrill & Stetson are about to send their commercial attache, Mr. Nathan A. Hurwitz, on a trip to Australia, the Dutch East Indies, the Straits Settlements, China, Siberia and Japan, in which countries he will make an exhaustive survey of conditions, interviewing financiers, builders, engineers, manufacturers, jobbers and general merchants. The company reports an optimistic view of the expansion to be gained in this way.

Western Office Opened —

The McMyler-Interstate Company, manufacturers of coal and ore handling machinery, locomotive cranes, railroad equipment, etc., have opened a branch office in the Merchants Exchange Building San Francisco, with L. A. Somers as district representative.

Contracts Awarded —

NePage McKenny Company of Portland, Ore., have the contract for the electrical equipment of the new plant of the Oregon Casket Company and also of the St. Johns Terminal Company.

Smith McCoy Electric Company installed the wiring for the Pure Food Show now in progress in Portland.

National Electric Company has the following contracts under construction at the present time: Telephone Exchange, Arleta; Masonic Apartments, The Dalles, Ore.; Western Structural Steel Company, Live Stock Exchange Building, and Astoria Flour Mills.

Jaggar-Sroufe Company are completing the wiring of two boats for J. R. Hamify Company, Marshfield, and have the contracts for the Elks Building, Pendleton; New Pacific Power & Light Company's station, Astoria; the new Mitchell Lewis Staves Company's building, and the cutting over of the Meier & Frank Company's store of the lighting system to alternating current for the Northwestern Electric Company.

Electrical Department Opened —

The largest department store in Portland, the Meier & Frank Company, have opened up a complete electric appliance store in their basement, with J. C. Naylor in charge. Mr. Naylor was at one time district manager at Goldendale, Wash., from which position he resigned to enter the army. He was in the 80th Division, 305th Engineers, and served one and one-half years.

Notice of Removal —

The Meyers Electric Safety Switch Company of 1236 Mission Street, San Francisco, announce their removal on November 15th to larger quarters at 247 Minna Street.

New Store —

Spott Brothers have opened a new electrical store in Oakland.

New Retail Establishment —

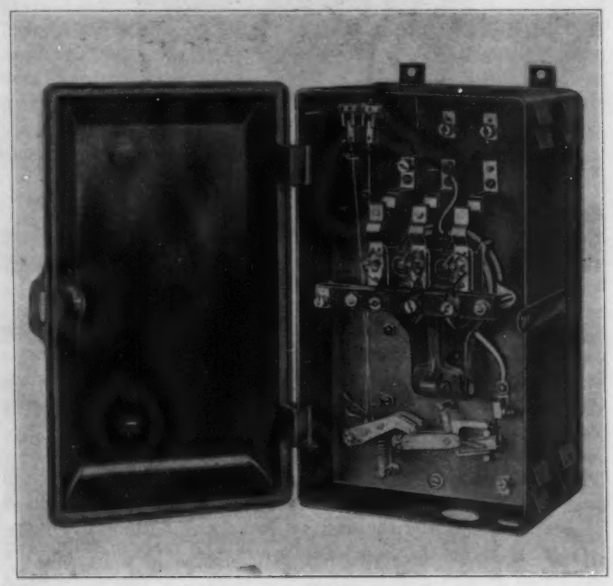
P. H. Smith, formerly of the Chicago office of the Hurley Machine Company, comes to the Pacific Coast to take charge of the recently established Thor Shop at 124 Post St., San Francisco. This attractive store is devoted entirely to washing machines, acting as a service station in cooperation with the contractor-dealers, and conducting a continuous demonstration on its premises. Full details of the establishment are given elsewhere in this issue. B. Badrian, formerly sales manager for the company in northern California, is now district sales manager for the Pacific Coast.

LATEST IN EVERYTHING ELECTRICAL

(New designs in switches featuring special safety devices and simplicity of operation are among the recent industrial items presented here. A distribution type transformer with exceptionally highly developed insulation and a conveniently adaptable indicator are also described.—The Editor.)

NEW STARTING SWITCH

It is permissible to start induction motors up to and including 5-hp., and in some localities up to and including 7½-hp., by merely connecting the motor to the power circuit. Small induction motors can be started under these conditions



This starting switch, enclosed in a steel box, with conduit connection for all wires, has special devices for automatic overload protection.

without injury, and in the past it has been customary to start them by simply closing a knife switch, or switch similar to a knife switch.

For the man who wanted something better, there were switches which would short circuit the fuses while the motor was starting; and then after the motor had come up to speed, the operator could make a second motion with a starting switch, inserting the fuses in the motor circuit, to be used while it was running.

A new device for this kind of work has just been developed by the Electric Controller & Manufacturing Company of Cleveland, Ohio, to make the starting of these motors foolproof. It is known as the A.C. Starting Switch, and is operated by a push button. It is enclosed in a steel box, with conduit connection for all wires. A neat compact push button arranged for conduit connection is supplied, for "starting" or "stopping" the motor.

Two wires extending the length of the slate on one side, give overload protection of the inverse time element type, both while the motor is starting and while it is running.

The principle used is one entirely new in motor starting practice. These two wires are stretched, and the operating value of this overload protection is adjustable by changing the tension of the wire. If too much current is being taken by the motor, these wires will expand, causing the small contact at the bottom to be open and this will in turn, de-energize the magnet coil and cut the motor off the power line. It is then necessary to push the Start button before the motor can again be started.

The same principle is used in ammeters, and gives an extremely accurate overload protection, at the same time giving inverse time element feature.

There are no laminations used in any part of this a.c. starting switch. It is only necessary to push the Start button to start the motor, and it is only necessary to push the Stop button to stop the motor.

DISTRIBUTION TYPE TRANSFORMERS

Both shell and core type constructions are used by the Wagner Electric Manufacturing Company, of St. Louis, in their distribution transformers. For 2300 volts, core type construction is employed in the smaller sizes, and the shell type in larger sizes. For 6900 volts and higher the core type is used exclusively.

Special attention has been paid to insulation. All insulating materials are carefully tested, and double cotton covered wire is used for all coils. The various layers of the high voltage coils are separated by two thicknesses of a tough fibrous material, each of which will withstand three times normal voltage per layer. Two layers form a much more reliable insulation than a single layer of double thickness. In all coils, the layer insulation is considerably wider than the winding, thus giving additional protection to the end turns.

A practically indestructible barrier between low-voltage and high-voltage coils is secured by mica tubes reinforced with fibre insulating material to give strength. This tube projects beyond the ends of the coils so that the low-voltage winding is as safe from high voltages as it is possible to make it.

Coil and core assembly of the Wagner core-type distribution transformer

In order to make the transformer coils doubly safe they are treated with an impregnating compound. This is applied in a heated vacuum tank so that it is forced into

every fibre of the thoroughly dried insulation. Coils thus treated have much greater mechanical strength, conduct heat more readily and are much less affected by moisture than those that are untreated.

In mechanical design the transformers have various special features. The coils are so mounted that there is no possible chance of their becoming loose in transportation and handling. The low-voltage leads are all brought out through one opening in the case, so that no stray currents will be set up in the case, causing losses. The porcelain bushings through which the leads pass are patented, and are so designed that the leads cannot possibly touch each other or touch the case.

The regulation of Wagner Transformers is well within standard practice. The windings are so arranged that even on motor loads the drop in voltage is not enough seriously to affect the candle-power of lamps on the circuit.

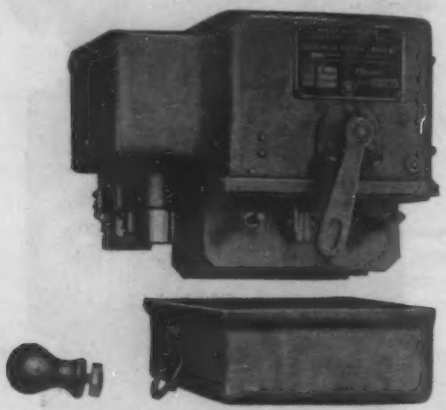
The transformers have generous coil surfaces so that they radiate heat readily to the oil, and the case surfaces are sufficiently large to radiate the heat carried to them by the oil. Furthermore, the coils are so designed that there are no pockets in which the oil will become stagnant and excessively hot and dangerous to the insulation.

SAFETY STARTING SWITCH

Safety for the operator, safety for the motor and equipment and safety for itself are the three features embodied in a new type of starting switch for small induction motors that is being put on the market by the Westinghouse Electric & Manufacturing Company. The switch is absolutely accident proof and practically fool proof as well.

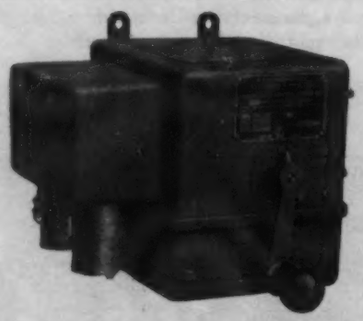
The action of the switch is automatic and consists of strong springs attached to the contact parts and controlled by a trigger. This trigger is released by overload, failure of power or by hand. When the switch passes the neutral point, the spring snaps it the rest of the way. Safety to the operator from injury due to contact with live parts is assured by the entirely enclosed, dust-and-dirt proof case. It is impossible to touch the live parts by accident for this reason.

To ensure safety to the operator and equipment from restarting after the machine has shut down, a low voltage protective relay releases the trigger when power leaves the equipment, and throws the switch. Upon the return of power, it is necessary for the operator to move the handle first to the reset position and then to the running position, before the motor can be restarted.



A low voltage protective relay releases the trigger when power leaves the equipment, and throws the switch.

Any undue overload causes the overload relay to release a trigger, which opens the switch as in the case of failure of voltage. Overload throws off the switch just the same as no power does, and the switch must be reset before the motor can be started again. This overload relay prevents burn-out of the motor. Motor burn-outs may arise from two causes—an overload machine or the opening of one wire, due to the blowing of a fuse or other cause, and subjecting the remaining phase to a double burden. The overload relay may be set to open the switch at any desired point, such as 105%—110%—150% of full load. Fuse protection is not sufficient to guard motors against burn-out. A fuse that will carry, without blowing, the starting current which is several times the operating current, will also carry, without blowing, sufficient overload to burn out the motor. The overload relay is provided with oil dash pots which afford a time element, permitting the carrying of small peak loads and the starting current



An entirely enclosed dust-and-dirt proof case prevents any danger to the operator from contact with live parts.

without interruption of service. However, they will allow the operation of the overload relay if the overload is heavy or is sustained long enough to threaten the motor. This insures the motor against burn-out and at the same time permits maximum production.

Replacing burned-out fuses with copper wire when new fuses are not available, results in a burned-out motor, the next time an overload occurs. This danger is eliminated because the new switch uses no fuses and automatically resets itself when the overload is removed. Beside this, the danger of shocks and burns in replacing burned-out fuses is eliminated.

When the handle of the switch, moving toward the ON position, passes the neutral point, the spring whips the contacts together. The same action takes place with the opening of the switch. This rapid opening and closing of the contacts practically eliminates the injurious effects of arcing and preserves the life of the switch.

Asbestos barriers, between the sets of adjacent contacts, have permitted the omission of switch oil with all its accompanying fire hazards and other objectionable features. But when explosive gases are present and the danger of explosion is greater than the fire hazard, the contacts may be immersed in oil.

Emergency stop push buttons may be connected in the low voltage relay circuit and located at any convenient point near the machine. This switch has been approved by the National Board of Fire Underwriters. Two sizes are made, each for use on two and three phase motors, on voltage up to 600.

UNIVERSAL INDICATOR

The outstanding feature of the "Universal C. O. D. Indicator" manufactured by the Roller-Smith Company of New York is that it can be applied to all makes of cars, regardless of varying types of lighting, voltage, and starting systems.

It can be connected in the starting circuit, if necessary, as in the case of certain single unit systems, and the cranking current, no matter how heavy, will not injure it.

The diameter of the body is 2 inches and the depth behind the flange ½ inch. It derives its name "C. O. D." from the three indications on its movable barrel—"Charge." "Off," "Discharge."

Books and Bulletins

Principles of Direct-Current Machines

by Alexander S. Langsdorf, M. M. E., Professor of Electrical Engineering and dean of the Schools of Engineering and Architecture, Washington University. 460 pages; size 6 x 8½ in.. Published by McGraw-Hill Book Company, Inc., New York, and on sale at the Technical Book Shop, San Francisco, price $4.00.

As a comprehensive treatment of the fundamental principles underlying the design and operation of all types of direct-current machinery, this book holds an important place among text books for students of electrical engineering. The present edition is a complete revision of the first, published four years ago, and has been considerably amplified. The explanations are full but concise, and adequately illustrated with line drawings. Each chapter concludes with a set of problems covering the preceding material.

The book includes eleven chapters, the first of which is entirely devoted to general laws and definitions.

Bureau of Standards

Among recent Technologic papers of the Bureau of Standards is Electrolysis in Concrete, Paper No. 18, by E. B. Rosa, Burton McCollum and O. S. Peters. This paper constitutes a revision of Technologic Paper No. 18 on Electrolysis in Concrete, issued March 19, 1913. It contains the results of a series of long time tests which show that with reinforcing iron anode at very low current densities, rusting of the iron and cracking of the concrete eventually occur. In the specimens under test, damage became apparent in from four to eight years. The cathode effects noted in former tests had not progressed much beyond the point reached at the end of the first two or three years.

Paper 127 of the same series is "Leakage Resistance of Street Railway Roadbeds and its Relation to Electrolysis of Underground Structures," by E. R. Shepard. Several methods of making electrical resistance measurements on street railway roadbeds, and on experimental roadbeds are described and the results of such measurements are given in tabular and graphical form. Certain conclusions are reached regarding the best type of roadbeds and the best methods of treating ties where the reduction of stray currents is important.

Magnets for Industrial Use

The Cutler-Hammer Manufacturing Company of Milwaukee and New York have prepared a number of standard (8½ by 11 in.) descriptive booklets which illustrate and describe various types of C-H apparatus. A recent addition to this list of publications is known as Booklet "J" and is illustrative and descriptive of C-H Rectangular Magnets which are particularly adapted for efficient handling of regular shapes in steel and iron. The advantages of using a rectangular magnet over any other type for handling such material as sheets, bars, billets, ingots, pipes, etc., is maximum lifting capacity for a given weight of magnet, resulting in economy in the price of the magnet, crane equipment, and current consumption, and besides, greater speed in handling the material. The booklet makes mention of a few typical applications where C-H rectangular magnets are handling ship plates, pipe, cold-rolled steel in coils, and other material. In one instance, one of the magnets had a record of unloading 50 tons of plate in 50 minutes from a railroad car to stock pile. Numerous illustrations show the magnets in use in several prominent plants. The booklet describes the magnet construction, gives dimensions and other engineering data and tables of lifting capacities for various classes of material.

Measuring Flow in Pipes

The selection of the type of meter to be employed in measuring the flow of water though a pipe line should be based upon the consideration of the difficulties of installation, permanency of operation, accuracy of measurement, and the cost of installation and maintenance. Tests to determine the practicability of employing thin-plate orifices in pipe lines, and the conditions most favorable for their use as measuring devices, have been completed by the Engineering Experiment Station of the University of Illinois under the direction of R. E. Davis, Associate in Civil Engineering, and H. H. Jordan, Assistant Professor in General Engineering Drawing.

The tests were conducted with three sets of orifices of eight different diameters per set cut in 3/16-inch steel plates. Data were obtained from 4-inch, 6-inch, and 12-inch pipe systems respectively. The results of these tests are given in detail in Bulletin No. 109 entitled, "The Orifice as a Means of Measuring Flow of Water through a Pipe."

Copies of Bulletin No. 109 may be had without charge by addressing the Engineering Experiment Station, Urbana, Illinois.

Electrical Devices for the Farm

An attractively illustrated booklet with a three-color art cover and pleasing two-color pages, setting forth more than seventy uses to which electric power can be applied as an efficiency builder and labor saver on the farm, is a recent publication of the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Penn., entitled "The New Farm Help."

The booklet explains not only how electric power can be utilized for doing a large amount of work on the farm, but how it provides the best, safest and most convenient form of light and how it takes the drudgery out of many of the hardest household tasks of the farmer's wife.

Not only are many illustrations given showing in detail various forms of electrical apparatus in operation, but much instructive information is set forth relative to the selection of sizes of motors to be used for driving various machines, especially of the heavier types, and how to be sure of getting reliable electrical apparatus.

Bureau of Mines

Excerpts from the monthly reports on minerals investigations of the Bureau of Mines include three articles on iron, copper, and gold and silver respectively; a paper on the Manganese Situation by W. R. Crane; on Abrasives by O. Bowles; on Magnesite, and on Talc and Soapstone. W. C. Phalen and R. B. Ladoo were respectively in charge of the two latter investigations.

"Explosives and Miscellaneous Investigations" is the title of Bulletin 178 D just issued by the Bureau. "The Vapor Pressure of Lead Chloride" by E. D. Eastman and L. H. Duschak is Technical Paper 225.

The monthly statements listing the coal mine fatalities in the United States for the months of June and July, 1919, compiled by Albert H. Fay for the Bureau of Mines, have recently been sent out.

Transactions, Proceedings and Reports

The July, 1919 issue of the Transactions of the South African Institute of Electrical Engineers has recently been received.

The Society for the Promotion of Engineering Education has sent out its bulletin—"Engineering Education"—for September.

The Bulletin of the National Electric Light Association for September has recently been issued.

The American Society of Electrical Engineers has published its Proceedings for October, 1919.

The Statistical Report of Electric Undertakings in Japan, for June, 1919, has been received from the Department of Communications, Tokyo, Japan.

The October number of Mechanical Engineering, the monthly journal of the American Society of Mechanical Engineers, is now being distributed.

NEW ELECTRICAL DEVELOPMENTS

(A number of important new power installations are features of the Northwest activities during the past two weeks. Interesting particulars of the Don Pedro project come in with the news of the Pacific Central district, together with several far-reaching plans for transmission and power developments. The Pacific Southwest and the Intermountain district are active in irrigation and the improved distribution of electricity.—The Editor.)

THE PACIFIC NORTHWEST

CENTRALIA, WASH.—The Washington Light & Power Company is considering the matter of erecting a plant here.

ASTORIA, ORE.—The repair shop of the Pacific Power & Light Company has been destroyed by fire, causing a loss of $20,000.

VANCOUVER, WASH.—It is proposed to provide the city of Vancouver with a strictly modern, up-to-date and attractive lighting system.

BEND, ORE.—At a recent meeting of the city council the mayor suggested that an adequate system of municipal lighting should be adopted.

ASTORIA, ORE.—The Port Commission has taken up the matter of installing an underground electric power system throughout the port property.

TACOMA, WASH.—According to figures submitted by the city light and power department of Tacoma, it has made a net profit of $296,914 for the first nine months of the year.

THE DALLES, ORE.—Cluster lights will be installed along Second Street, the main thoroughfare of the city. Ten city blocks will be lighted with three clusters to each block.

SPOKANE, WASH.—Latest returns from an election recently held here indicate that the proposal to have the city acquire and operate a hydroelectric power plant was voted down.

TACOMA, WASH.—Allis-Chalmers Manufacturing Company recently sold to the Defiance Lumber Company at Tacoma a 150 and a 75-hp. motor, power being supplied by the Tacoma municipal plant.

CENTRALIA, WASH.—The City Commission has signed up a contract with the Sherman County Light & Power Company to furnish current to the city for the five-year period from October 1, 1920.

PETERSBURG, ALASKA.—A site for a $75,000 hydroelectric plant has been acquired near here by the city council and it is expected that the plant will be built at once. It is to have 5,000 hp. capacity.

EVERETT, WASH.—The city will not hold the election which was to have been held on November 15 to decide whether or not a municipal power plant shall be constructed, and asking for sufficient bonds to cover the proposal.

LOS ANGELES, CAL.—Wilmington Transportation Company has sold to the city of Avalon the city water and power system. A new gas plant will be built. A $150,000 bond issue provided for the purchase of property and the erection of the gas plant.

VENTURA, CAL.—The Sespe Light & Power Company has made application to the State Railroad Commission for a certificate to develop electrical energy in Ventura county and to make 100,000 acre-ft. of water available for irrigation purposes. Two reservoirs will be constructed.

SEATTLE, WASH.—The city of Seattle has awarded a contract to the Pelton Water Wheel Company for an 18,000 hp. water wheel at $73,616 and to the Westinghouse Electric & Manufacturing Company a contract for a 14,285-kva. generator at $63,175, delivery in seven months.

SEATTLE, WASH.—Fairbanks, Morse & Company, 550 First Avenue South, Seattle, recently shipped a 75-hp. engine to the Ladysmith Smelter Corporation at Latouche, Alaska, and a 100-h.p engine to the Salt Chuck Mining Company at Cassan, Alaska. These are of the Type "Y" semi-Diesel engine.

KLAMATH FALLS, ORE.—The Pelican Bay Lumber Company of this city has just placed an order with the Portland office of Allis-Chalmers Manufacturing Company for a 1000-kw. turbine. This unit will be complete with condenser, exciter and centrifugal injection pump. The machinery is for 480 volts, 60 cycle, three-phase service and has a capacity of 1500 amperes per terminal at full speed.

SEATTLE, WASH.—Specifications submitted to the Board of Public Works some two months ago, covering the construction work and materials required in the creation of the Swan Lake impounding reservoir, are being revised in compliance with the request of the Board and it is thought by the assistant superintendent of water, John Lamp, that calls for bids for the construction contracts may be made late this fall.

SEATTLE, WASH.—C. F. Uhden, engineer in charge of the Skagit River power project construction, is of the opinion that the city will be using current from the hydroelectric plant on the Skagit River within three years. After a further study of the Gorge Creek conditions and various details of preliminary work, he outlined his plans to Mayor Fitzgerald. The engineer is inclined to favor cinstruction of a steam road from Rockport, the nearest railroad point, which is 23 miles from Gorge Creek.

SEATTLE, WASH.—Increase of fare on Seattle's municipal street railway system from 5 cents to 6 cents with an additional charge of 1 cent for transfers, is forecast in a report covering the finances of the street railway department for the six months' period ending September 30, filed with the city council. Asserting that the operating expenses will be increased about $500,000 a year by the passage of the pending ordinance requiring the street railway department to stand the cost of paving between tracks, Superintendent Murphine states that the department will be unable to pay this increased expense out of the present revenues.

SEATTLE, WASH.—Allis-Chalmers Manufacturing Company was recently awarded a contract by the city for a 12,500 -kw.steam turbine unit, 80 per cent power factor, complete with 200-kw. exciter. The exciter will be driven by both steam turbine and electric motor. The contract for this equipment was placed direct with the Allis-Chalmers Manufacturing Company through its Seattle sales office and was not a combined bid with Charles C. Moore & Company, as was indicated in the Journal of October 15. Charles C. Moore & Company were awarded the contract for boilers and auxiliary equipment as heretofore announced.

WENATCHEE, WASH.—As a solution to the power problem of the Wenatchee valley, General Manager George D. Brown of the Wenatchee Valley Gas & Electric Company has submitted to the power users and the public a proposition to buy the bonds necessary to finance an enlargement of the Chelan Falls plant. It is estimated that the cost of adding another 1000 hp. to the Chelan Falls plant will be $80,000. The company proposes to issue first mortgage bonds bearing six per cent interest secured by this plant and the contracts for the sale of the power and asks the power users of the valley to buy these bonds at once so that the machinery can be ordered and the unit installed in time for next season's business.

THE PACIFIC CENTRAL DISTRICT

WOODLAND, CAL.—Woodland is to have an underground wire system for light, power and telephone within the fire limits.

MARTINEZ, CAL.—The Commissioner's sale of the Oakland, Antioch and Eastern Electric Railroad to satisfy a mortgage against the line for $6,500,000, has been postponed until Novem-

ESCALON, CAL.—Escalon Water and Light Company is installing a new pump at a cost of over $2,000. It is one of the Byron Jackson latest models, 12-inch 7-stage, to be operated with a 25-hp. horizontal motor.

SAN FRANCISCO, CAL.—Western States Gas & Electric Company has closed a contract with the California Wine Association for 150 horsepower in motors for the Fresno Cooperage Company, which is establishing a plant at Richmond to employ about 200 men.

RICHMOND, CAL.—The city council and members of the Merchants' Association discussed plans for lighting the business streets of the city with electroliers in place of the arc lights now used. It is planned to have the electric light company install the system and to have the city purchase it in yearly payments.

SAN FRANCISCO, CAL.—The Board of Supervisors has granted John A. Fears a spur track permit to switch electrically driven cars across Mission Street at Twelfth. A large industry with a building to cost $250,000 was to to be established at that point when the spur track privilege was obtained, it was said.

BRODERICK, CAL.—Geo. Swanston is the owner of about 4000 acres north of the Southern Pacific Railroad within the Yolo Basin. He is taking the first steps toward reclaiming this land. For irrigation purposes two fifteen-inch pumps will be used and wells of sufficient capacity will be drilled to a depth of over two hundred feet.

REDDING, CAL.—The Pit River Power Company, which is to spend $17,000,000 on power development along Pit River above Copper City, has just completed surveying contours on both sides of the stream for a distance of 25 miles. The contours at an altitude of 200 feet mark the proposed height of the lower dam, which will back up the river twenty miles or more.

WOODLAND, CAL.—Contracts for the rebuilding of several miles of irrigation canals, water heads and gates have been let to Shattuck-Eddinger Company of San Francisco by the Yolo Water and Power Company. The canals to be rebuilt are the Maple Canal at Woodland and the Willow Canal at Winters. The improvements will enable the company to double its irrigation service next season.

ALTURAS, CAL.—An agreement prepared by E. C. Bonner was signed in his office by directors of the Hot Springs Valley Irrigation District, J. V. Caldwell, J. W. Cummings, H. Stuber, E. D. Claussen and G. M. Kelley, with H. P. Wood for the purchase of 800 acres and water rights of H. P. Wood on what is known as Big Sage. The full purchase price of $20,000 cash is to be paid on or before June 7, 1920.

MARYSVILLE, CAL.—Surveying of the extension of the ditch of the recently organized Cordua Irrigation Company was commenced by Arthur Edmonson, civil engineer of Palo Alto. Under the new plans 5422 acres of land will be served with water from Yuba River through the "Cleveland ditch" and its extension. Rice and

vegetables will be the principal products of the district, which is situated about six miles northeast of Marysville.

PORTERVILLE, CAL.—The Western Pipe & Steel Company of San Francisco has been awarded the contract for the auxiliary gas plant which is to be built here by the Central Counties Gas Company. The local plant, which is being built at the foot of Bartlett hill, near the northern city limits, will furnish gas to Porterville, Lindsay and Exeter, in case of any interruption in supply from the central generating station in Visalia.

YUBA CITY, CAL.—Surveying and excavation work which will extend from the Sutter-Butte canal to Gilhauzer slough and include 20,000 acres to be planted to rice in Sutter county has been begun by Painter & Miller, engineers of Marysville. There will be a canal eight miles long to carry water to the rice fields. The project is the largest of its kind ever launched in Sutter county and is expected to lead to other large developments in the rice industry here.

PARADISE, CAL.—The Board of Directors of the Paradise Irrigation District have ordered a bond election for the purpose of voting a second bond issue in the amount of $140,000. The money derived from the sale of bonds will be used in placing a 36-inch pipe from the reservoir to the present intake pipes, thus doing away with the canal, which has proved expensive and wasteful. The present system, with radial gates in the spillway at the dam, will allow five feet more in depth of water in the reservoir.

MERCED, CAL.—After a long executive session, the board of supervisors announced that they had reached a favorable agreement on the matter of the petition for the formation of the Merced Irrigation District and issued a fall for a special election for a vote on the matter. The election will be held November 25. The petition for the four smaller districts, the lands of which lie within the proposed district, was denied. The Plainsburg district petition was allowed. The boundaries of the Merced district, as finally settled by the board, include a total of 17,420 acres.

FORT JONES, CAL.—Scott Valley has two great enterprises, a railroad and an irrigation project, in addition to the irrigation district, which mean much toward the further development of the varied resources of this district. Promoters of both are confident they will become realities. A party of engineers has been at work at the upper end of the valley for the past week running surveys and taking levels for a cooperative irrigation project. It is understood that the purpose of this is to provide the Scott Valley irrigation district's big ditch with an increased volume of water, and also to increase the acreage to be covered by irrigation.

SONOMA COUNTY, CAL. — Indications that the California Telephone & Light Company, operating in Sonoma county, intends to purchase the Mount Konocti Light & Power Company, operating in Lakeport, Kelseyville, Upper Lake and Hopland in Lake and Mendocino counties, are contained in the petition filed with the State Railroad Commission by the Mount Konocti Company to sell to the California Company. The Mount Konocti plant cost, it is said, $81,868 to construct. The sale price mentioned is $71,400. The California Company, which joins in the petition, asks that it be allowed to issue $75,000 in bonds with which to consummate the deal.

AUBURN, CAL.—The Pacific Gas & Electric Company has accepted delivery of a large consignment of Anaconda heavy copper wire, which is unloaded at the Wise Power House near this city. The shipment is valued at $125,000. A top power line will be installed from the Wise Power Station to supply the Sacramento Valley demands. Work is to be commenced at once on the additional power line. Negotiations are under way to erect and maintain a third power station in this county, near Loomis, receiving surplus overflow from the Wise Station, and increasing the power development. Water used at the projected station will not interfere with irrigation supply over the territory involved.

PORTERVILLE, CAL. — Materials are being assembled and a crew is being recruited here for a complete reconstruction of the transmission system of the Mt. Whitney Power & Electric Company, which will entail building 80 miles of 60,000-volt line to replace the 30,000 line now in use. A complete private telephone line is also to be built connecting all plants and stations on the system, and other means will be taken to make possible speedy location of line trouble. The longest line in the new system will be that from the new substation at Richgrove, via Porterville, Ducor, Lindsay and Strathmore, which will be about 35 miles in length. Because of the uncertainty of the supply of copper, aluminum wires are to be used in this work.

OAKDALE, CAL.—Additional power is to be generated by the Sierra and San Francisco Power Company on the Stanislaus river, application having been made for 150 second feet of water to be taken out of the south fork of that river. Notice of the application was received by the Oakdale Irrigation District and the directors decided that they would not oppose it, as the proposed diversion would not injure the irrigators in any way. It is proposed to divert the water at Philadelphia ditch and at Sand Bar and run it through a power plant to be erected at Baker's Bridge. This will give the power company a double use of all the water it now has stored in the mountains above Oakdale. The water commission has set a date for the hearing of this application.

MODESTO, CAL. — A meeting of the city council resulted in the adoption by the board of several important measures. A public improvement program, amounting to $400,000, was agreed upon, and a bond issue for carrying it through will be submitted to a vote of the people early in December. The city attorney was instructed to draw up an ordinance providing for a special election. The public improvement program for 1929-1920 includes an electrolier system and electric police calls, $20,000; water extension, $49,000; paving extensions, $90,000; storm sewer, $75,000; septic tank and filter beds, $30,000; sanitary sewers, $35,000; street department (street sweeper, etc.), $16,000; Dry Creek Park, $16,000; aviation field and fair grounds, $50,000; city hall site, $20,000; a total of $400,000.

MODESTO, CAL.—The transmission and distribution system for the power plant that is to be developed in the Don Pedro irrigation project will cost the Modesto district $238,000, which added to the cost to install the power plant at the dam of $190,000, makes a total of $428,000 as Modesto's share. The transmission line from the dam to Waterford is estimated to cost this district $30,000, which amount is included in the total. Revenues from power and light are estimated at $126,700 per year, which is over 7 per cent on a capitalization of $400,000. Of this amount, $60,000 is to come from the development of irrigated rice lands in this district by electrically propelled pumps; $43,000 from operating pumps for drainage purposes, and $18,000 from farm light and power. These figures are but half the power capacity from the proposed plant. The other surplus, it is suggested, can be sold in Modesto, which is fast growing industrially.

THE PACIFIC SOUTHWEST

PALMDALE, CAL.—Engineer Burt Cole of Palmdale Irrigation District is working out plans for building the proposed $300,000 dam in Littlerock Creek.

VENTURA, CAL.—Concrete light posts will be erected on each side of California Street from Santa Clara Street to 300 ft. of the south line of Front Street.

NEWPORT, CAL.—A special bond election was held October 28th for the purpose of voting on a $160,000 bond issue for irrigation canals, etc., in the Newport Heights Irrigation District.

SAN DIEGO, CAL.—The city council has adopted a resolution calling for a bond election for the building of the Barrett Dam. $1,000,000 will be used for the dam and $200,000 for improvement and repairs to the pipe line and distributing system.

PHOENIX, ARIZ. — Geo. H. Maxwell, exdirector of the National Reclamation Association, together with R. F. Olmstead of the engineering firm of Olmstead & Gates, has organized the farmers of upper Gila valley into a fater users' association. A report will be made on the irrigation investigations in this district.

TUCSON, ARIZ.—Secretary Lane of the Department of the Interior has been authorized to construct a diversion dam on the Gila twelve miles east of Florence at a cost of $250,000. This dam will serve as a diversion dam for the San Carlos reservoir when it is constructed, and in the meantime will irrigate about 62,000 acres of land in addition to that now in cultivation.

SAN BERNARDINO, CAL.—The Pacific Electric Company will expend more than $25,000 on improvement of its San Bernardino-Redlands line between now and Jan. 1, 1920, as announced by company officials. Through cars will be run to Redlands from Los Angeles; four cars a day will at first be operated. The present tracks will be torn up and heavier steel rails laid. The car barns at Redlands will also be remodeled to take care of the larger cars.

THE INTER-MOUNTAIN DISTRICT

MACKAY, IDA.—This city plans to install a white way lighting system on its main street at a cost of approximately four thousand dollars.

OGDEN, UTAH.—Business men located on one of the principal streets of this city are pettiioning the City Commission to install a white way street lighting system.

BRIGHAM CITY, UTAH.—Construction work was started October 27 on the new white way street lighting installation for this city. The system will be in operation by the middle of November.

SALT LAKE CITY, UTAH. — The Uintah Power & Light Company has just filed articles with the secretary of state, increasing its capital stock to $500,000. The company serves Myton and other towns in the Uintah Basin.

CHALLIS, IDA.—W. W. Adamson of this city has made application to the Public Utilities Commission for permission to build a power plant and furnish this city with electric service. The Commission will probably grant the request.

WINNEMUCCA, NEV.—Anderson & McShee have been awarded the contract for the concrete work on the new reservoir for fire purposes which the Winnemucca Water & Light Company is building. Twenty-five thousand square feet of concrete lining will be laid.

RUPERT, IDA.—The government has issued notice of an increase in rates for electric service for this city, which is supplied from the government Minidoka plant, of approximately 20% in light and power rates and in heating rates from $1.25 to $2.00 per kw. The government has also ordered the segregation of the heating system from the light and power circuits.

BUHL, IDA.—The Farmers' Mutual Light & Power Company have purchased the power site at Clear Lakes from W. C. Hazard for a consideration of $43,000. The purchase includes the steam engine and all equipment to be used in the construction of a power plant. Work will begin at once and will be pushed to early completion. It is expected that by early spring the farmers on the west end of the Twin Falls tract will be using electric service.

Housewiring and the specification of the architect seem always to have been a bad combination for the electrical contractor. One architect, however, apparently more understanding than other members of his brotherhood, has seen the joke and composed the following specimen:

The title is: Specifications of wire-pulling in connection with a girl's residence in ———.

General Conditions

Objects.—As the primary object of the electrical installation is the amusement of the inmates, the workmen shall use all diligence in regaling the girls with gruesome stories of death by electrocution, whether by lightning, in the chair, by accident or for pleasure. They shall also give them a thorough knowledge of the theory of electricity and enable them to define offhand the difference between direct currents and Valencia raisins.

Board.—The board under which this work shall be done is composed of twenty-four members, each one of whom has a distinct, separate, and different idea as to how the work shall proceed. The contractor, under a heavy penalty, shall absolutely guarantee satisfaction to each individual member as well as to the board collectively. Failure to accomplish this will abrogate any liability whatever on the part of the architect as to the issuance of a final certificate.

Voting.—In the case of a tie-vote between any two, four, six, eight, ten or twenty members, the president shall have the casting vote as to how the work shall be done, after which the workmen will proceed to do it as they damn please.

Foreman.—The foreman shall not only provide heavy bonds, but shall also wear a chain and ball as a repressive measure against his inevitable desire to abduct, elope with, abscond with or otherwise to get away with the pretty secretary of the board.

Treasury.—The treasury will not be guarded. If it is not dishonestly robbed during the progress of the work it will sure be honestly robbed at the conclusion of the job, so in any event the till will be empty.

Soldering Irons.—Soldering irons may be used in connection with the work, but their use shall in no case be diverted to the curling of the girls' hair. Nothing but soft solder shall be used, and to facilitate the smooth running of the job it shall be handed to the matron in large quantities.

Switches.—Only one switch will be required and this shall remain in the hands of the matron for the chastisement of any girl who may attempt to electrify the workmen by flashes from her eyes.

Inspection.—The work, as usual, will be inspected, and if the building be burned down through faulty installation the inspector will require no further evidence that the work is defective, and may order its immediate removal.

* * *

A mere hairpin can be extremely disconcerting at times, as the following story, sent in by one of our San Francisco friends, will show:

"It was just an ordinary hairpin. You can pick up a dozen like it in any block on Market Street. Dislodged from its place of usefulness by the jolting of the street car, it had fallen on the floor of the car, directly over the motor. Playful lines of magnetic force caught it and furnished the several occupants of the car with varying degrees of amusement, astonishment and consternation.

With the application of power, the hairpin rose on end and waved weirdly about, to drop lifelessly to the floor when the controller was spun to neutral.

The two factory girls giggled; the citizen with the pipe and the mortar-crusted trousers crossed himself; the dignified gentleman with the tortoise-shell pince-nez adjusted his evening paper to conceal stolen glances.

Our dark-skinned cousin across the aisle viewed the phenomenon with unconcealed agitation. We stopped at a crossing, and the hairpin fell, pointing directly at him; he picked up his pound bag of sugar ready for flight, but held his ground. The controller clicked and the hairpin rose, wavered uncertainly, made a complete hesitating circle, and dropped to the floor as though this time certain of its victim. Worse than broken mirrors! Worse than a dozen black cats! Our dark friend and his pound of sugar left us in the middle of the block."

* * *

The high cost of living seems to have disturbed even nature herself. A farmer's wife in the north of England whose dooryard commands the only approach to a waterfall which all tourists long to see, last year collected toll at the rate of four cents a head. This year she asks six. When asked the reason, she exclaimed, "Waterfalls is gone up."

—And the West planning so many hydroelectric projects, too!

* * *

You hear a good deal about "electrical men"; permit us to introduce one. We hope, however, that you will not allow him to get on your mind, for as a vision in a nightmare we can hardly imagine anything more disconcerting. The idea of "a large gathering of electrical men," also, seems somehow to have lost its appeal for us just at present, in the light of this picture.